Transcend Wireless

10 INDUSTRIAL AVE,
SUITE 3
MAHWAH NJ 07430

PHONE: 201.684.0055

May 12, 2017

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Notice of Exempt Modification
240 Kensington Road, Berlin, CT
Latitude- 41.62620000
Longitude- -72.77560000

Dear Ms. Bachman,

T-Mobile currently maintains (9) antennas at the 181' level of the existing 190' monopole at 240 Kensington Road in Berlin, CT. The tower is owned by Crown Castle. The property is owned by the Town of Berlin. T-Mobile now intends to replace (6) of its existing antennas with (6) new 1900/2100 MHz antennas. These antennas would be installed at the same 181' level of the tower. T-Mobile also intends to install (1) new hybrid cable.

T-Mobile was unable to find any conditions associated with the original approval of this tower. Based on the scope-of-work, this modification will comply with any conditions from the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. 16-50j-72(b)(2). In accordance with R.C.S.A. 16-50j-73, a copy of this letter is being sent to Mark H. Kaczynski, Mayor of the Town of Berlin, as well as the tower owner and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2).

1. The proposed modification will not result in an increase in the height of the existing structure

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. 16-50j-72(b)(2).

Sincerely,

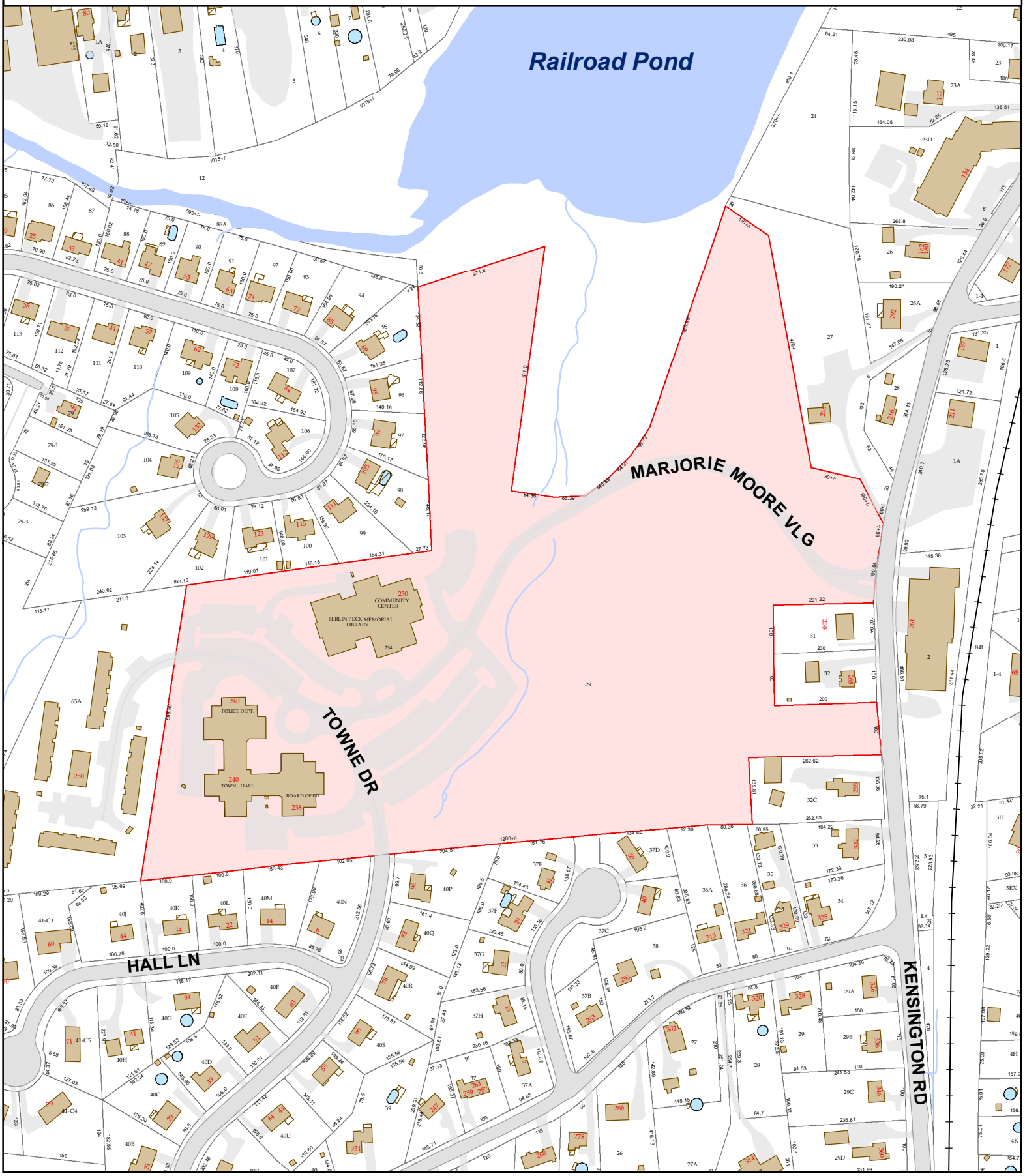
Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Mark H. Kaczynski- as elected official
Crown Castle- as tower owner
Maureen Giusti- as zoning official

Town of Berlin, Connecticut - Assessment Parcel Map

Parcel: 9-3-54-29-8026 Address: 240 KENSINGTON RD



N W E S

Approximate Scale: 1 inch = 250 feet

0 90 180 270 360 Feet

Map Produced: September 2014

Town of Berlin, CT

Property Listing Report

Map Block Lot	16-4-142-4-12	Account	1065292

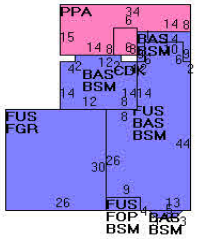
Property Information

Property Location	51 WALDEN CT
Owner	ALDRICH WENDY M
Co-Owner	
Mailing Address	51 WALDEN CT BERLIN CT 06037
Land Use	1010 Single Family
Land Class	R
Zoning Code	R-21
Census Tract	

Neighborhood	11
Acreage	0.51
Utilities	All Public
Lot Setting/Desc	Level
Additional Info	

Photo

Sketch



Primary Construction Details

Year Built	1997
Stories	2
Building Style	Colonial
Building Use	Residential
Building Condition	A-
Floors	Carpet
Total Rooms	8

Bedrooms	4 Bedrooms
Full Bathrooms	2
Half Bathrooms	1
Bath Style	Average
Kitchen Style	Average
Roof Style	Hip
Roof Cover	Asph/F Gls/Cmp

Exterior Walls	Clapboard
Interior Walls	Drywall
Heating Type	Forced Air-Duc
Heating Fuel	Oil/Gas
AC Type	Central
Gross Bldg Area	5488
Total Living Area	2960

Report Created On 5/12/2017

Town of Berlin, CT

Property Listing Report | Map Block Lot **16-4-142-4-12** | Account **1065292**

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	298900	209200
Extras	0	0
Improvements	298900	209200
Outbuildings	0	0
Land	109800	76900
Total	408700	286100

Outbuilding and Extra Items

Type	Description

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Garage, Attached	780	0
Basement	1300	0
Upper Story, Finished	1696	1696
First Floor	1264	1264
Porch, Open, Finished	36	0
Composite Deck	48	0
Patio Paver	364	0
Total Area	5488	2960

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
BEASLEY EDWARD T & BONITA M	406/ 0	6/5/1998	344900
ALDRICH SAMUEL C & WENDY M	421/ 659	6/1/1999	331500
ALDRICH WENDY M	586/ 81	4/23/2007	0

Report Created On 5/12/2017

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11004B

Newington_1
240 Kensington Road
Berlin, CT 06037

April 27, 2017

EBI Project Number: 6217001856

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	11.50 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
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April 27, 2017

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11004B – Newington_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **240 Kensington Road, Berlin, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **240 Kensington Road, Berlin, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) Since some radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 1.29 dB of additional cable loss for all ground mounted 700 MHz Channels, 2.37 dB of additional cable loss for all ground mounted 1900 MHz channels and 2.44 dB of additional cable loss for all ground mounted 2100 MHz channels were factored into the calculations used for this analysis. This is based on manufacturers Specifications for 230 feet of 1-5/8" coax cable on each path.

8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **Ericsson AIR32 B2A/B66AA** & **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-A1M** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B2A/B66AA** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-A1M** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **181 feet** above ground level (AGL).

12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

13) All calculations were done with respect to uncontrolled / general public threshold limits.

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	181	Height (AGL):	181	Height (AGL):	181
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	1.10	Antenna B1 MPE%	1.10	Antenna C1 MPE%	1.10
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	181	Height (AGL):	181	Height (AGL):	181
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,678.43	ERP (W):	7,678.43	ERP (W):	7,678.43
Antenna A2 MPE%	0.90	Antenna B2 MPE%	0.90	Antenna C2 MPE%	0.90
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	181	Height (AGL):	181	Height (AGL):	181
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.22	Antenna B3 MPE%	0.22	Antenna C3 MPE%	0.22

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.21 %**
AT&T	0.80 %
Clearwire	0.14 %
MetroPCS	0.68 %
Nextel	0.47 %
Town of Berlin	5.61 %
Verizon Wireless	1.59 %
Site Total MPE %:	**11.50 %**

T-Mobile Sector A Total:	2.21 %
T-Mobile Sector B Total:	2.21 %
T-Mobile Sector C Total:	2.21 %
Site Total:	11.50 %

T-Mobile _Max Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	181	5.48	AWS - 2100 MHz	1000	0.55%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	181	5.48	PCS - 1900 MHz	1000	0.55%
T-Mobile AWS - 2100 MHz UMTS	2	1,279.74	181	3.00	AWS - 2100 MHz	1000	0.30%
T-Mobile PCS - 1900 MHz UMTS	2	1,279.74	181	3.00	PCS - 1900 MHz	1000	0.30%
T-Mobile PCS - 1900 MHz GSM	2	1,279.74	181	3.00	PCS - 1900 MHz	1000	0.30%
	1	865.21	181	1.02	700 MHz	467	0.22%
						Total*:	**2.21%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.21 %
Sector B:	2.21 %
Sector C:	2.21 %
T-Mobile Per Sector Maximum:	2.21 %
Site Total:	11.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.50%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

NEWINGTON_1

SITE ID: CT11004B - L1900

CROWN CASTLE BU NO.: 826217

240 KENSINGTON ROAD

BERLIN, CT 06037

T-MOBILE RF CONFIGURATION

794DB_1xAIR+1QP+1DP

PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

   A. REMOVE AND REPLACE EXISTING POSITION ONE (1) ANTENNA, TYPICAL OF (3)/(1) PER SECTOR, WITH (3) PROPOSED AIR 32 ANTENNAS.

   B. REMOVE AND REPLACE EXISTING POSITION TWO (2) ANTENNA, TYPICAL OF (3)/(1) PER SECTOR, WITH (3) PROPOSED PANEL ANTENNAS.

   C. INSTALL ONE (1) PROPOSED ERICSSON HYBRID CABLE SYSTEM FROM EXISTING EQUIPMENT AT GRADE TO ANTENNA SECTORS ON TOWER.

   D. REMOVE AND REPLACE EXISTING POWER BREAKER FOR PROPOSED 100A BREAKER.

PROJECT INFORMATION

SITE NAME:	NEWINGTON_1
SITE ID:	CT11004B – L1900
SITE ADDRESS:	CROWN CATLE BU NO.: 826217 240 KENSINGTON ROAD BERLIN, CT 06037
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	JAIME FORD (PROJECT MANAGER) VERTICAL DEVELOPMENT, LLC (774) 248–5373
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°–37'–34.34" N LONGITUDE: 72°–46'–32.29" W GROUND ELEVATION: 129'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
N–1	DESIGN BASIS AND SITE NOTES	0
C–1	SITE LOCATION PLAN	0
C–2	COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.	0
E–1	TYPICAL ELECTRICAL DETAILS	0

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS–BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

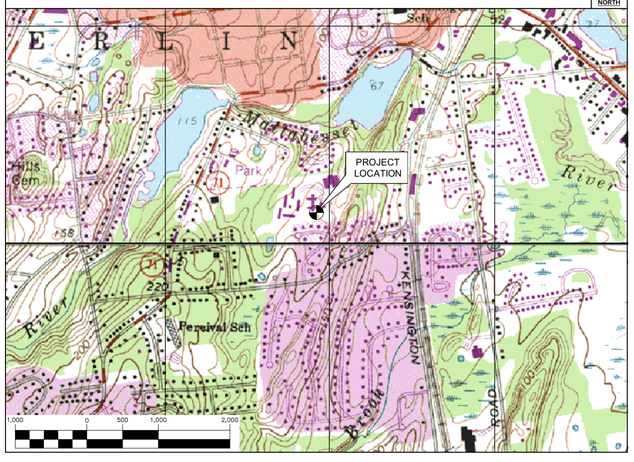
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002 **TO:** 240 KENSINGTON ROAD, BERLIN, CT 06037

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT–187	1.89 MI.
4.	TURN LEFT ONTO CT–305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT–305.	0.01 MI.
6.	MERGE ONTO I–91 S TOWARD HARTFORD	16.80 MI.
7.	MERGE ONTO CT–9 N via EXIT 22N TOWARD NEW BRITAIN	2.21 MI.
8.	TAKE EXIT 21 TOWARD EAST BERLIN/US–5 N/CT–15 N	0.23 MI.
9.	KEEP RIGHT TO TAKE THE RAMP TOWARD BERLIN/HARTFORD	0.04 MI.
10.	TURN RIGHT ONTO MILL ST/CT–372	0.57 MI.
11.	TURN LEFT ONTO WORTHINGTON RDG/CT–372	0.07 MI.
12.	TURN RIGHT ONTO MILL ST/CT–372	1.41 MI.
13.	TURN LEFT ONTO MAIN ST	0.10 MI.
14.	TAKE THE FIRST LEFT ONTO KENSINGTON RD.	0.46 MI.
15.	TAKE SECOND RIGHT ONTO MARJORIE MOORE VLG. DESTINATION IS ON THE LEFT	0.18 MI.

VICINITY MAP

SCALE: 1" = 1000'



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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

NEWINGTON_1

SITE ID: CT11004B – L1900

240 KENSINGTON ROAD
BERLIN, CT 06037

DATE: XX/XX/XX
SCALE: AS NOTED
JOB NO. 17012.XX

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–105 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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STATE OF CONNECTICUT · CRAIG A. GAUDREAU · 21547 · REGISTERED PROFESSIONAL ENGINEER

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SITE ID: CT11004B - L1900
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240 KENSINGTON ROAD
BERLIN, CT 06037

DATE: XX/XX/XX
SCALE: AS NOTED
JOB NO. 17012.XX

DESIGN BASIS AND SITE NOTES

N-1

1 / C-1 SITE LOCATION PLAN
SCALE: 1" = 80'

APPROX. NORTH

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

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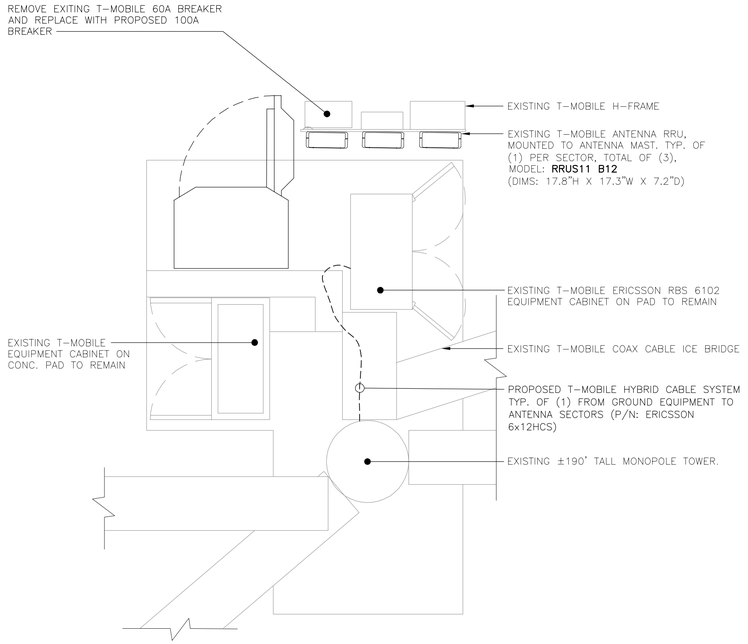
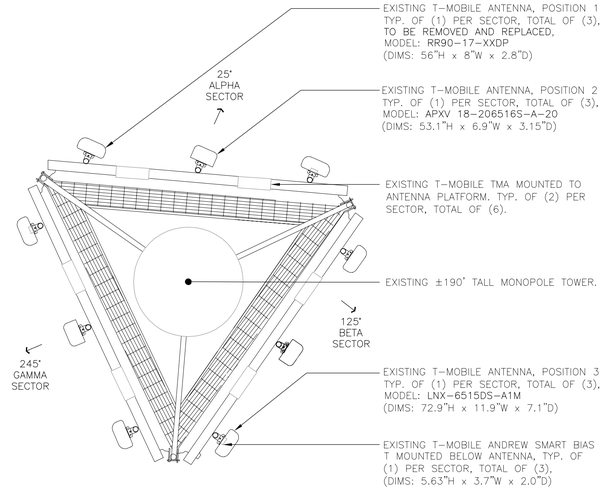
SITE LOCATION PLAN

C-1

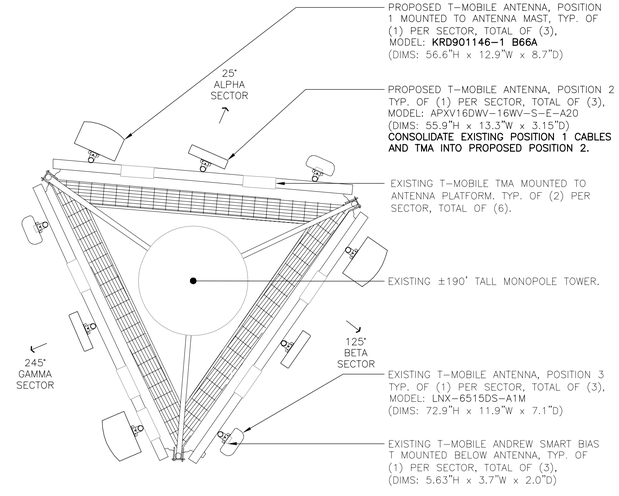
Sheet No. 3 of 5



3 C-2 **EQUIPMENT PLAN**
SCALE: 3/8" = 1'
TRUE NORTH

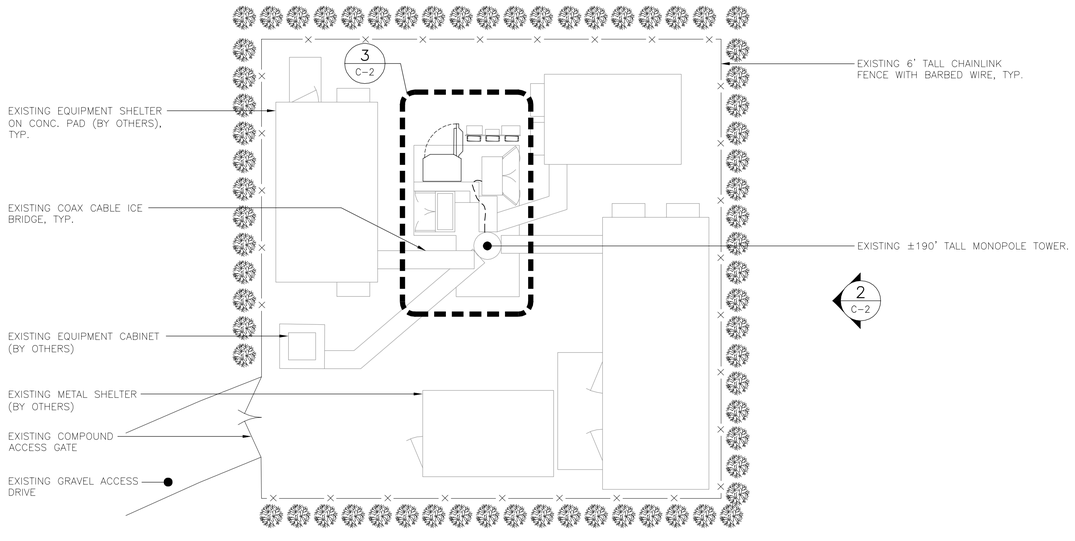


4 C-2 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1'
181' ELEVATION
TRUE NORTH



T-MOBILE RAN TEMPLATE:
794DB OUTDOOR (EVOLVED FROM 4B)
T-MOBILE RF CONFIGURATION:
794DB_1xAIR+1QP+1DP

5 C-2 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1'
181' ELEVATION
TRUE NORTH

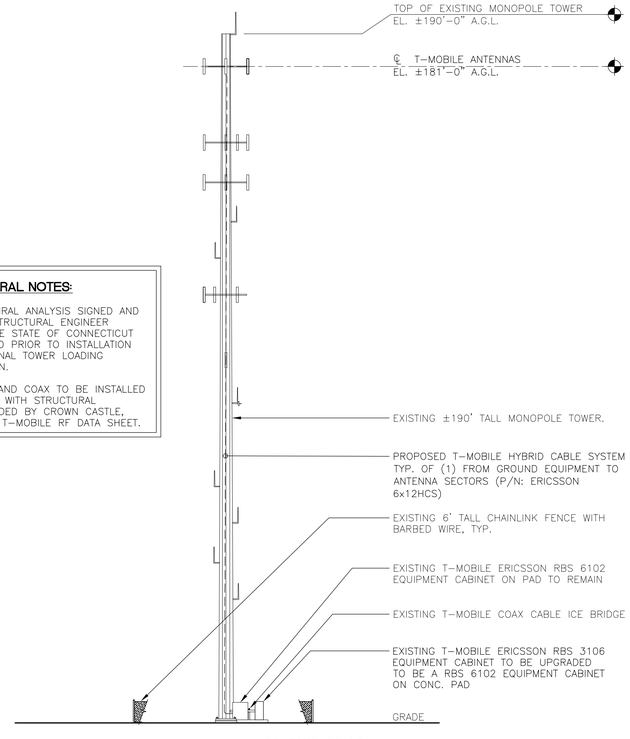


1 C-2 **COMPOUND PLAN**
SCALE: 1/8" = 1'
TRUE NORTH

GRAPHIC SCALE
8 0 4 8 16 32
(IN FEET)
1 inch = 8 ft.

TOWER STRUCTURAL NOTES:

1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE, INC. AND FINAL T-MOBILE RF DATA SHEET.



2 C-2 **WEST TOWER ELEVATION**
SCALE: 1" = 20'

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

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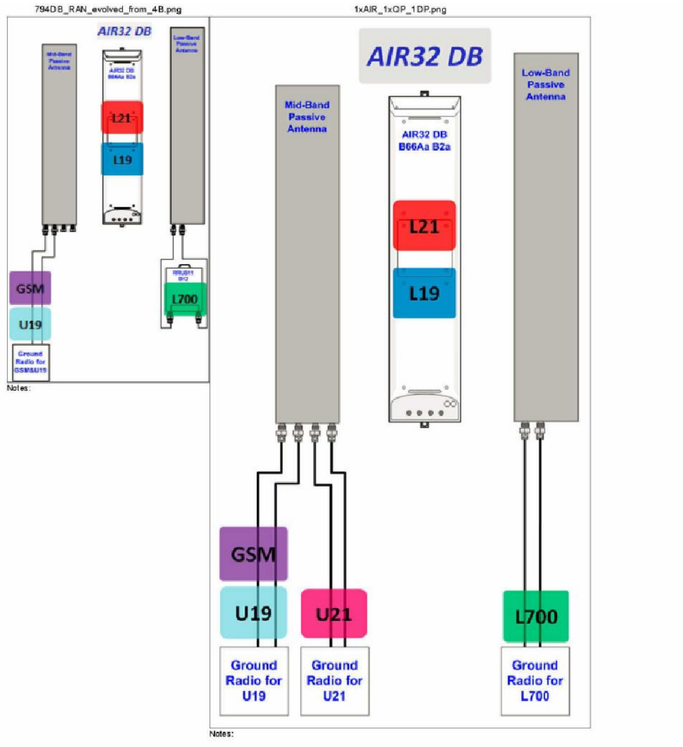
JOB NO.	17012.XX

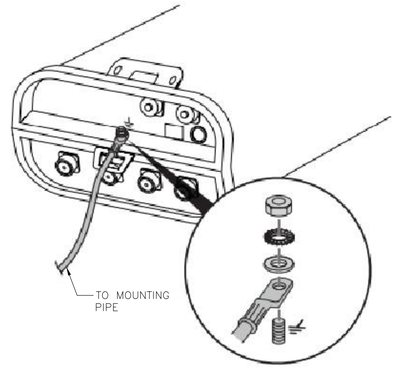
COMPOUND PLAN, ELEVATION AND ANTENNA MOUNTING CONFIG.

C-2

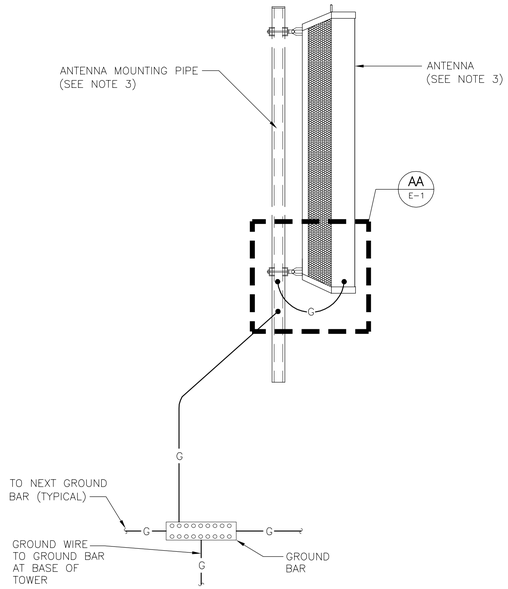
Sheet No. 4 of 5



2 E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NONE



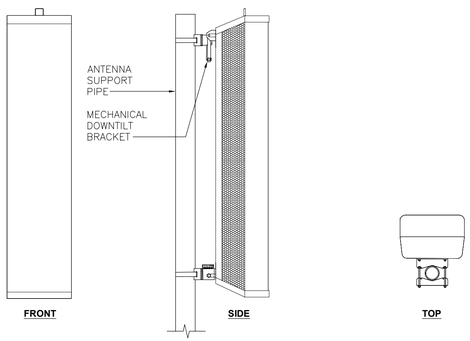
AA E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE



NOTES:

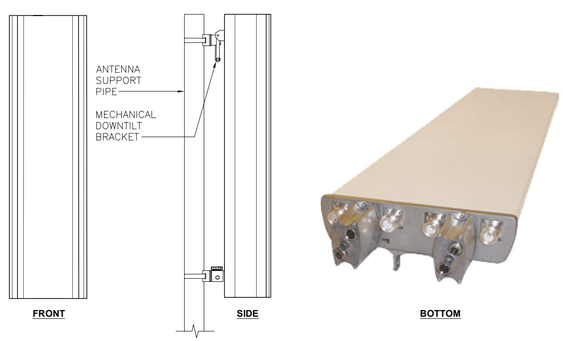
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: KRD901146-1_B66A_B2A	56.65"L x 12.87"W x 8.66"D	132.2 LBS.

3 E-1 **PROPOSED AIR 32 ANTENNA DETAIL**
SCALE: NONE



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APX16DWV-16DWVS-E-A20	55.9"L x 13"W x 3.15"D	40.7 LBS.

4 E-1 **PROPOSED PANEL ANTENNA DETAIL**
SCALE: NTS

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TYPICAL ELECTRICAL DETAILS

E-1
Sheet No. 5 of 5

April 18, 2017

Sean Dempsey
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(704) 405-6565

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
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btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11004B
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	826217
	Crown Castle Site Name:	Newington_1
	Crown Castle JDE Job Number:	433196
	Crown Castle Work Order Number:	1390807
	Crown Castle Application Number:	386362 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	87581.015.01
Site Data:	**240 Kensington Road, Berlin, Hartford County, CT** **Latitude *41° 37' 34.3"*, Longitude *-72° 46' 32.33"*** **191.667 Foot - Monopole Tower**	

Dear Sean Dempsey,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1025743, in accordance with application 386362, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

All equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully submitted by:
B+T Engineering, Inc.

Jacob Johnson, E.I.T.
Project Engineer

Scott S. Vance, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2018

4/18/17

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 191.6 ft. Monopole designed by PiROD Manufactures and mapped by TEP in May of 2015. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F. This tower was modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 1 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
184.0	181.0	3	Ericsson	AIR -32 B2A/B66AA	1	1-5/8	--
		3	Rfs Celwave	APX16DWV-16DWVS-E-A20			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
192.0	196.0	1	Kathrein	OGB4-900D	1	7/8	1
191.0	196.0	1	Andrew	DB589-A	1	5/16	1
	191.0	1	--	Side Arm Mount [SO 702-1]			
	190.0	1	Motorola	WB2623			
184.0	184.0	**3**	**Ems Wireless**	**RR90-17-02DP**	**--**	**--**	**4**
		3	**Rfs Celwave**	**APXV18-206516L-A**			
		1	--	Platform Mount [LP 405-1]	18	1-5/8	1
	181.0	3	Commscope	ATBT-BOTTOM-24V			
		3	Commscope	LNX-6515DS-VTM			
		6	Ericsson	KRY 112 144/1			
160.0	160.0	3	Alcatel Lucent	RRH2X60-AWS	14	1-5/8	1
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x40 700			
		4	Andrew	LNX-6514DS-A1M			
		6	Commscope	HBXX-6517DS-VTM			
		2	Commscope	LNX-8513DS-VTM			
		1	Rfs Celwave	DB-T1-6Z-8AB-0Z			
		6	Rfs Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 303-1]			
158.0	158.0	1	Decibel	DB205-A	2	7/8	1
		1	Sinclair	SRL-224NM-4			
		2	--	Side Arm Mount [SO 702-1]			
151.0	151.0	4	Andrew	SBNH-1D6565C	12	1-1/4	1
		6	Comm Comp. Inc.	DTMABP7819VG12A			
		2	Kmw Comm.	AM-X-CD-16-65-00T-RET			
		3	Powerwave Tech.	7770.00			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
151.0	151.0	6	Powerwave Tech.	CM1007-DBPXBC-003	--	--	1
		6	Powerwave Tech.	LGP21901			
		1	--	Platform Mount [LP 403-1]			
148.0	148.0	3	Ericsson	TME-RRUS 12 B2	--	--	2
		3	Ericsson	TME-RRUS 11 B2	2	3/4	1
		1	Raycap	DC6-48-60-18-8F	1	3/8	
		1	--	Pipe Mount [PM 601-3]			
		1	--	Side Arm Mount [SO 102-3]			
132.0	132.0	1	Sinclair	SRL-235-2	1	7/8	1
		1	--	Side Arm Mount [SO 702-1]			
124.0	124.0	1	Decibel	PCS 1900 TMA RX	--	--	1
		1	--	Side Arm Mount [SO 104-3]			
116.0	118.0	9	Decibel	844G65VTZAS	--	--	3
	120.0	1	Andrew	VHLP2-18	3 6	1/2 5/16	1
		1	Dragonwave	HORIZON DUO			
	118.0	3	Argus Tech.	LLPX310R			
		3	Samsung Telecomm.	WIMAX DAP HEAD			
	116.0	1	--	Platform Mount [LP 405-1]			
90.0	99.0	1	Decibel	DB205-A	2 1 1	1/2 7/8 5/16	1
	90.0	1	Andrew	KP2F-34			
		1	MTI Wireless Edge	MT-485002			
		2	--	Side Arm Mount [SO 702-1]			
70.0	70.0	1	Sinclair	SRL-235-2	2	7/8	1
		1	--	Side Arm Mount [SO 701-1]			
33.0	33.0	1	Decibel	DB909XVTE-M	2	1/2	1
		1	--	Side Arm Mount [SO 702-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Abandoned Equipment; Considered in this analysis
4) Equipment To Be Removed; Not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
190.0	190.0	1	Decibel	DB809	1	1-5/8
177.67	177.67	12	EMS	RR90-17-00DP	12	1-5/8
155.0	155.0	2	Decibel	DB205	2	1-5/8
140.0	140.0	2	Decibel	DB205	2	1-5/8
127.67	127.67	12	EMS	RR90-17-00DP	12	1-5/8
117.67	117.67	12	EMS	RR90-17-00DP	12	1-5/8
25.0	25.0	1	Decibel	DB516	2	1-5/8
		1	Decibel	DB809M		
20.0	20.0	1	Decibel	DB205	1	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	T-Mobile Co-Locate, Rev. 0	386362	CCI Sites
Tower Manufacturer Drawing	PiROD, File No. A-115400	3438498	CCI Sites
Tower Mapping	TEP, Project No. 25651-57340	3438498	CCI Sites
Tower Modification Drawing	Natcomm Inc., Date: 03/18/2008	3678661	CCI Sites
Tower Modification Drawing	B+T Group, Date: 10/17/2014	4003976	CCI Sites
Post Modification Inspection	SGS, Date: 01/08/2015	5493013	CCI Sites
Tower Modification Drawing	B+T Group, Date: 06/16/2015	5753424	CCI Sites
Post Modification Inspection	SGS, Date: 10/21/2015	5947973	CCI Sites
Foundation Drawing	Pirod, File No. A-115400	3463552	CCI Sites
Geotech Report	French & Parrello, Job No. 98A209ERI	3438510	CCI Sites
	FDH, Project No. 1307031600		
Antenna Configuration	Crown CAD Package	Date: 04/10/2017	CCI Sites

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Mount areas and weights are assumed based on photographs provided.
5) The existing base plate grout was not considered in this analysis.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	191.667 - 181.583	Pole	P18x3/8	1	-11.243	784.878	3.3	Pass
L2	181.583 - 141.417	Pole	P24x3/8	2	-16.746	1052.070	66.6	Pass
L3	141.417 - 121.167	Pole	P36x3/8	3	-23.073	1490.100	60.7	Pass
L4	121.167 - 110.042	Pole	P42x3/8	4	-28.952	1668.870	60.2	Pass
L5	110.042 - 105.083	Pole	P42x3/8 [0.491966]	5	-30.787	2258.970	52.6	Pass
L6	105.083 - 100.917	Pole	P42x3/8 [0.560722]	6	-33.374	2511.220	50.9	Pass
L7	100.917 - 95.833	Pole	P48x3/8	7	-35.327	1847.490	63.1	Pass
L8	95.833 - 89.917	Pole	P48x3/8 [0.478186]	8	-37.711	2400.900	56.8	Pass
L9	89.917 - 80.833	Pole	P48x3/8 [0.578153]	9	-44.019	2953.780	55.3	Pass
L10	80.833 - 69.5	Pole	P54x3/8 [0.487033]	10	-50.586	2705.260	60.7	Pass
L11	69.5 - 60.583	Pole	P54x3/8 [0.591202]	11	-62.279	3367.630	57.7	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L12	60.583 - 52.167	Pole	P60x3/8 [0.514746]	12	-67.759	3120.260	59.8	Pass
L13	52.167 - 40.333	Pole	P60x3/8 [0.620238]	13	-76.217	3832.980	58.2	Pass
L14	40.333 - 28	Pole	P60x1/2 [0.597937]	14	-84.405	3822.170	65.4	Pass
L15	28 - 20.083	Pole	P60x1/2 [0.720286]	15	-90.896	4668.760	60.0	Pass
L16	20.083 - 17	Pole	P60x5/8	16	-93.232	4139.150	67.5	Pass
L17	17 - 11.667	Pole	P60x5/8 [0.72746]	17	-97.592	4913.120	61.7	Pass
L18	11.667 - 9.375	Pole	P60x5/8 [0.750143]	18	-99.123	5010.690	61.6	Pass
L19	9.375 - 4.833	Pole	P60x5/8 [0.831253]	19	-102.323	5144.780	60.8	Pass
L20	4.833 - 0	Pole	P60x5/8 [0.782103]	20	-105.675	4985.920	66.2	Pass
							Summary	
						Pole (L16)	67.5	Pass
						Rating =	67.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	180	1.0	Pass
1	Flange Connection	140	43.8	Pass
1	Bridge Stiffener	120	64.7	Pass
	Flange Connections		39.1	Pass
1	Bridge Stiffener	100	62.0	Pass
	Flange Connections		40.7	Pass
1	Bridge Stiffener	80	57.7	Pass
	Flange Connections		38.3	Pass
1	Bridge Stiffener	60	42.2	Pass
	Flange Connections		33.1	Pass
1	Existing Bridge Stiffener	40	52.5	Pass
	New Bridge Stiffener		44.5	Pass
	Flange Connections-53BC		36.9	Pass
	Flange Connections-47BC		33.2	Pass
1	Existing Bridge Stiffener	20	61.1	Pass
	New Bridge Stiffener		53.6	Pass
	Flange Connections-53BC		44.3	Pass
	Flange Connections-47BC		39.9	Pass
1	Anchor Rods	Base	33.9	Pass
1	Base Plate	Base	46.0	Pass
1	Base Foundation (Structure)	Base	65.6	Pass
1	Base Foundation (Soil Interaction)	Base	56.3	Pass

Structure Rating (max from all components) =	67.5%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

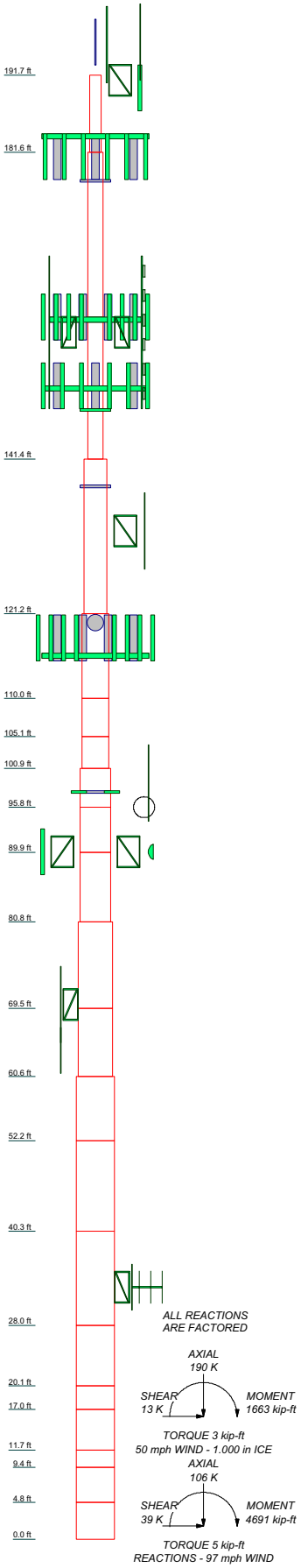
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the final load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P18x3/8	10.084	A53-B-42	0.7
2	P24x3/8	40.166		3.8
3	P36x3/8	20.250		2.9
4	P42x3/8	11.125		1.9
5	P42x3/8 [0.491966]	4.959	39.37551ksi	1.1
6	P42x3/8 [0.491966]	4.166	38.223719ksi	1.1
7	P42x3/8 [0.491966]	5.084	A53-B-42	1.0
8	P42x3/8 [0.478]	5.916	39.626857ksi	1.5
9	P48x3/8 [0.575]	9.084	38.103479ksi	2.7
10	P54x3/8 [0.487033]	11.333	40.19742ksi	3.1
11	P54x3/8 [0.591202]	8.917	38.531754ksi	3.0
12	P60x3/8 [0.514774]	8.416	39.917449ksi	2.7
13	P60x3/8 [0.620238]	11.834	38.170087ksi	4.8
14	P60x1/2 [0.597937]	12.333	40.659133ksi	4.7
15	P60x1/2 [0.720284]	7.917	38.6721ksi	3.7
16	P60x1/2 [0.720284]	3.083	A53-B-42	1.2
17	P60x1/2 [0.720284]	5.333	38.872566ksi	2.6
18	P60x1/2 [0.720284]	2.292	40.460872ksi	1.1
19	P60x1/2 [0.720284]	4.542	36.995527ksi	2.4
20	P60x5/8 [0.720284]	4.833	38.074682ksi	2.5
				48.3



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
OGB4-900D (E)	192	(2) DTMABP7819VG12A (E)	151
6' x 2" Mount Pipe (E-Omni support)	192	(2) DTMABP7819VG12A (E)	151
Lightning Rod 5/8" x 4' on 4' Pole (E)	191.667	(2) DTMABP7819VG12A (E)	151
DB589-A (E)	191	(2) LGP21901 (E)	151
WB2623 w/ Mount Pipe (E)	191	(2) LGP21901 (E)	151
3' x 2" Pipe Mount (E-For Omni)	191	(2) LGP21901 (E)	151
Side Arm Mount [SO 702-1] (E)	191	(2) CM1007-DBPXBC-003 (E)	151
LNX-6515DS-VTM w/ Mount Pipe (E)	184	(2) CM1007-DBPXBC-003 (E)	151
LNX-6515DS-VTM w/ Mount Pipe (E)	184	(2) CM1007-DBPXBC-003 (E)	151
LNX-6515DS-VTM w/ Mount Pipe (E)	184	Platform Mount [LP 403-1] (E)	151
(2) KRY 112 144/1 (E)	184	7770.00 w/ Mount Pipe (E)	151
(2) KRY 112 144/1 (E)	184	TME-RRUS 11 B2 (E)	148
(2) KRY 112 144/1 (E)	184	TME-RRUS 11 B2 (E)	148
ATBT-BOTTOM-24V (E)	184	DC6-48-60-18-8F (E)	148
ATBT-BOTTOM-24V (E)	184	TME-RRUS 12 B2 (R)	148
ATBT-BOTTOM-24V (E)	184	TME-RRUS 12 B2 (R)	148
AIR -32 B2A/B66AA w/ Mount Pipe (P)	184	TME-RRUS 12 B2 (R)	148
AIR -32 B2A/B66AA w/ Mount Pipe (P)	184	Side Arm Mount [SO 102-3] (E)	148
AIR -32 B2A/B66AA w/ Mount Pipe (P)	184	Pipe Mount [PM 601-3] (E)	148
APX16DWV-16DWVS-E-A20 w/ Mount Pipe (P)	184	TME-RRUS 11 B2 (E)	148
APX16DWV-16DWVS-E-A20 w/ Mount Pipe (P)	184	4' ICE SHIELDS (E)	138
APX16DWV-16DWVS-E-A20 w/ Mount Pipe (P)	184	Side Arm Mount [SO 702-1] (E)	132
Platform Mount [LP 405-1] (E)	184	Side Arm Mount [SO 104-3] (E-Mount Attachment)	132
4' ICE SHIELDS (E)	178	SRL-235-2 (E)	132
(2) HBXX-6517DS-VTM w/ Mount Pipe (E)	160	4' x 2" Pipe Mount (E-For Omni)	132
(2) HBXX-6517DS-VTM w/ Mount Pipe (E)	160	Side Arm Mount [SO 104-3] (E)	124
LNX-6514DS-A1M w/ Mount Pipe (E)	160	PCS 1900 TMA RX (E)	124
LNX-6514DS-A1M w/ Mount Pipe (E)	160	2' x 2" Pipe Mount (E-For TMA)	124
(2) LNX-6514DS-A1M w/ Mount Pipe (E)	160	(3) 844G65VTZAS w/ Mount Pipe (AB)	116
LNX-8513DS-VTM w/ Mount Pipe (E)	160	LLPX310R w/ Mount Pipe (E)	116
LNX-8513DS-VTM w/ Mount Pipe (E)	160	LLPX310R w/ Mount Pipe (E)	116
RRH2x40 700 (E)	160	LLPX310R w/ Mount Pipe (E)	116
RRH2x40 700 (E)	160	WIMAX DAP HEAD (E)	116
RRH2x40 700 (E)	160	WIMAX DAP HEAD (E)	116
RRH2X60-AWS (E)	160	WIMAX DAP HEAD (E)	116
RRH2X60-AWS (E)	160	HORIZON DUO (E)	116
RRH2X60-AWS (E)	160	Platform Mount [LP 405-1] (E)	116
RRH2X60-PCS (E)	160	(3) 844G65VTZAS w/ Mount Pipe (AB)	116
RRH2X60-PCS (E)	160	(3) 844G65VTZAS w/ Mount Pipe (AB)	116
RRH2X60-PCS (E)	160	Andrew VHLP2-18 (E)	116
(2) FD9R6004/2C-3L (E)	160	4' ICE SHIELDS (E)	98
(2) FD9R6004/2C-3L (E)	160	4' ICE SHIELDS (E)	98
(2) FD9R6004/2C-3L (E)	160	4' ICE SHIELDS (E)	98
DB-T1-6Z-8AB-0Z (E)	160	DB205-A (E-Per Photo)	90
Platform Mount [LP 303-1] (E)	160	MT-485002 w/ Mount Pipe (E)	90
(2) HBXX-6517DS-VTM w/ Mount Pipe (E)	160	Side Arm Mount [SO 702-1] (E)	90
DB205-A (E)	158	Side Arm Mount [SO 702-1] (E)	90
4' x 2" Pipe Mount (E-For Omni)	158	5' x 2" Pipe Mount (E-For Omni)	90
4' x 2" Pipe Mount (E-For Omni)	158	KP2F-34 (E)	90
Side Arm Mount [SO 702-1] (E)	158	2" x 2' Omni (E-Per Photo)	70
Side Arm Mount [SO 702-1] (E)	158	6' x 2" Mount Pipe (E-For Omni)	70
SRL-224NM-4 (E)	158	Side Arm Mount [SO 701-1] (E)	70
7770.00 w/ Mount Pipe (E)	151	Side Arm Mount [SO 102-3] (E-Mount Attachment)	70
7770.00 w/ Mount Pipe (E)	151	SRL-235-2 (E)	70
SBNH-1D6565C w/ Mount Pipe (E)	151	Side Arm Mount [SO 702-1] (E)	33
SBNH-1D6565C w/ Mount Pipe (E)	151	6' x 2" Mount Pipe (E-For Yagi)	33
(2) SBNH-1D6565C w/ Mount Pipe (E)	151	DB909XVTE-M (E)	33
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	151	2" x 4' Omni (E-Per Photo)	33
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	151		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	38.170087ksi	38 ksi	53 ksi
39.37551ksi	39 ksi	54 ksi	40.659133ksi	41 ksi	56 ksi
38.223719ksi	38 ksi	53 ksi	38.6721ksi	39 ksi	54 ksi
39.626857ksi	40 ksi	55 ksi	40.460872ksi	40 ksi	55 ksi
38.103479ksi	38 ksi	53 ksi	39.872566ksi	40 ksi	55 ksi
40.19742ksi	40 ksi	55 ksi	36.995527ksi	37 ksi	52 ksi
38.531754ksi	39 ksi	54 ksi	38.074682ksi	38 ksi	53 ksi
39.917449ksi	40 ksi	55 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 67.5%

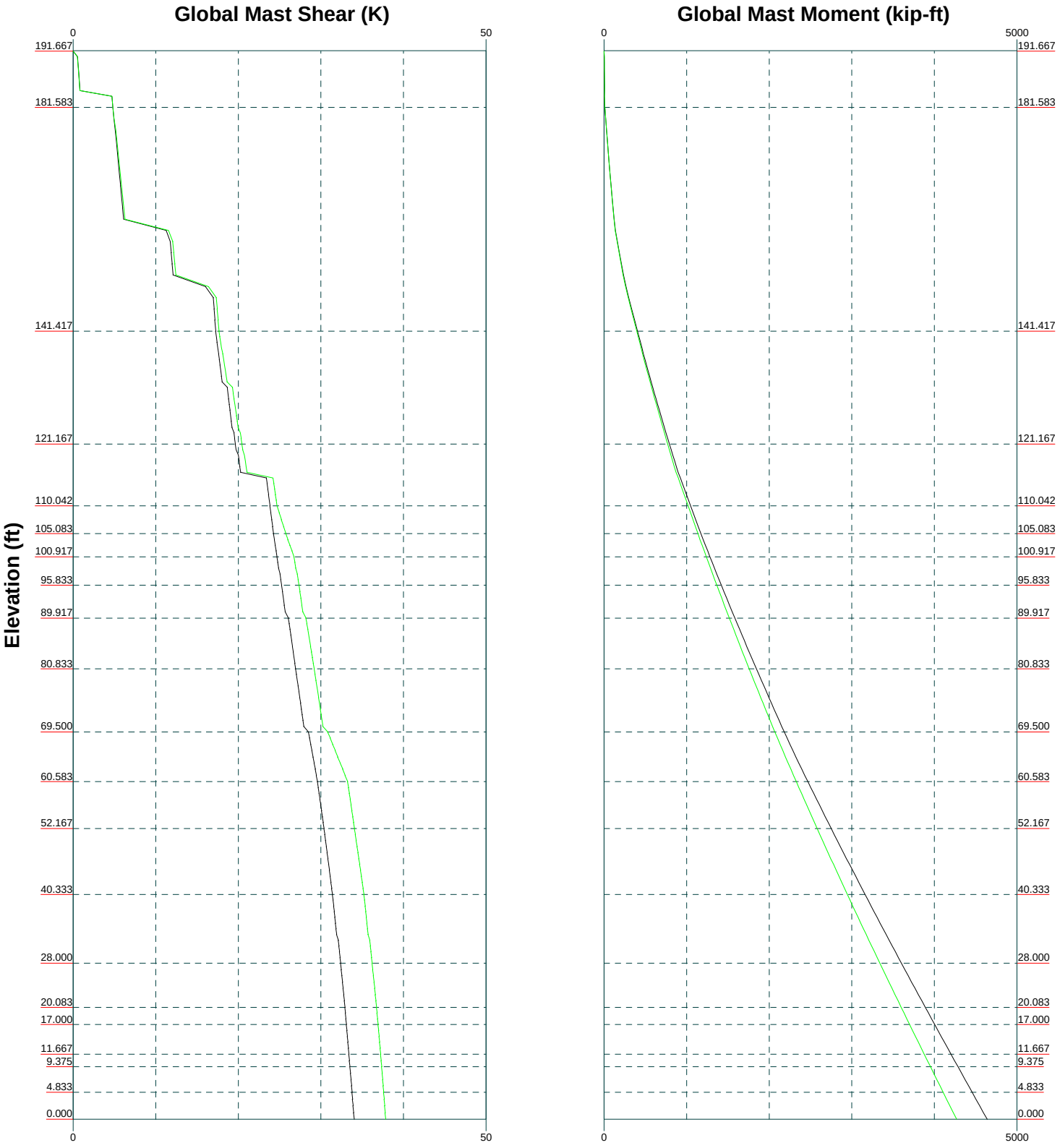
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 87581.015.01 - Newington_1, CT (BU# 826217
Project:
Client: Crown Castle | Drawn by: Deepak | App'd:
Code: TIA-222-G | Date: 04/18/17 | Scale: NTS
Path: | Dwg No. E-1

TIA-222-G - 97 mph/50 mph 1.000 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



B+T GRP

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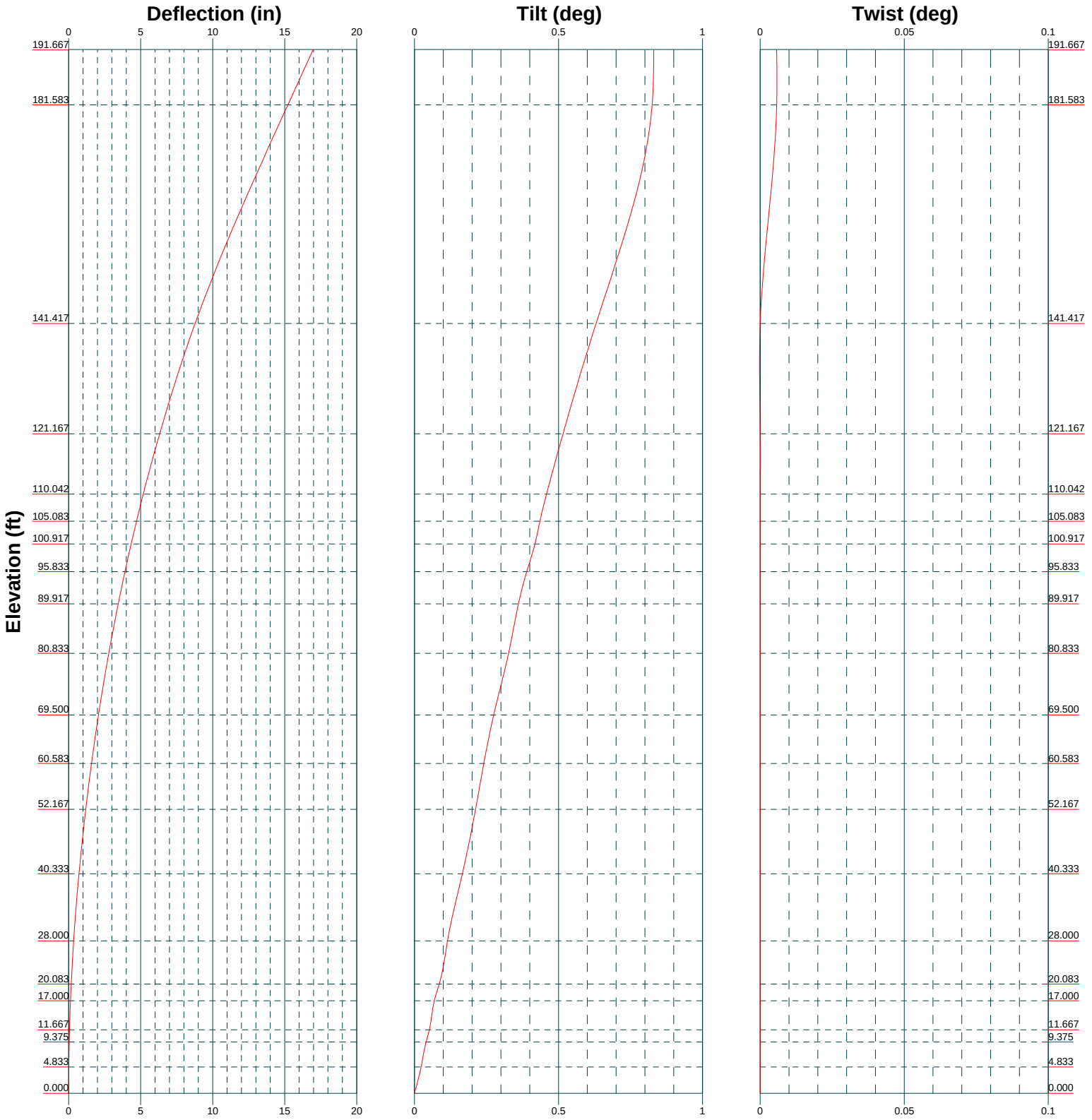
Job: *87581.015.01 - Newington_1, CT (BU# 826217*		
Project:		
Client: Crown Castle	Drawn by: Deepak	App'd:
Code: TIA-222-G	Date: 04/18/17	Scale: NTS
Path:		Dwg No. E-4

TIA-222-G - Service - 60 mph

Maximum Values



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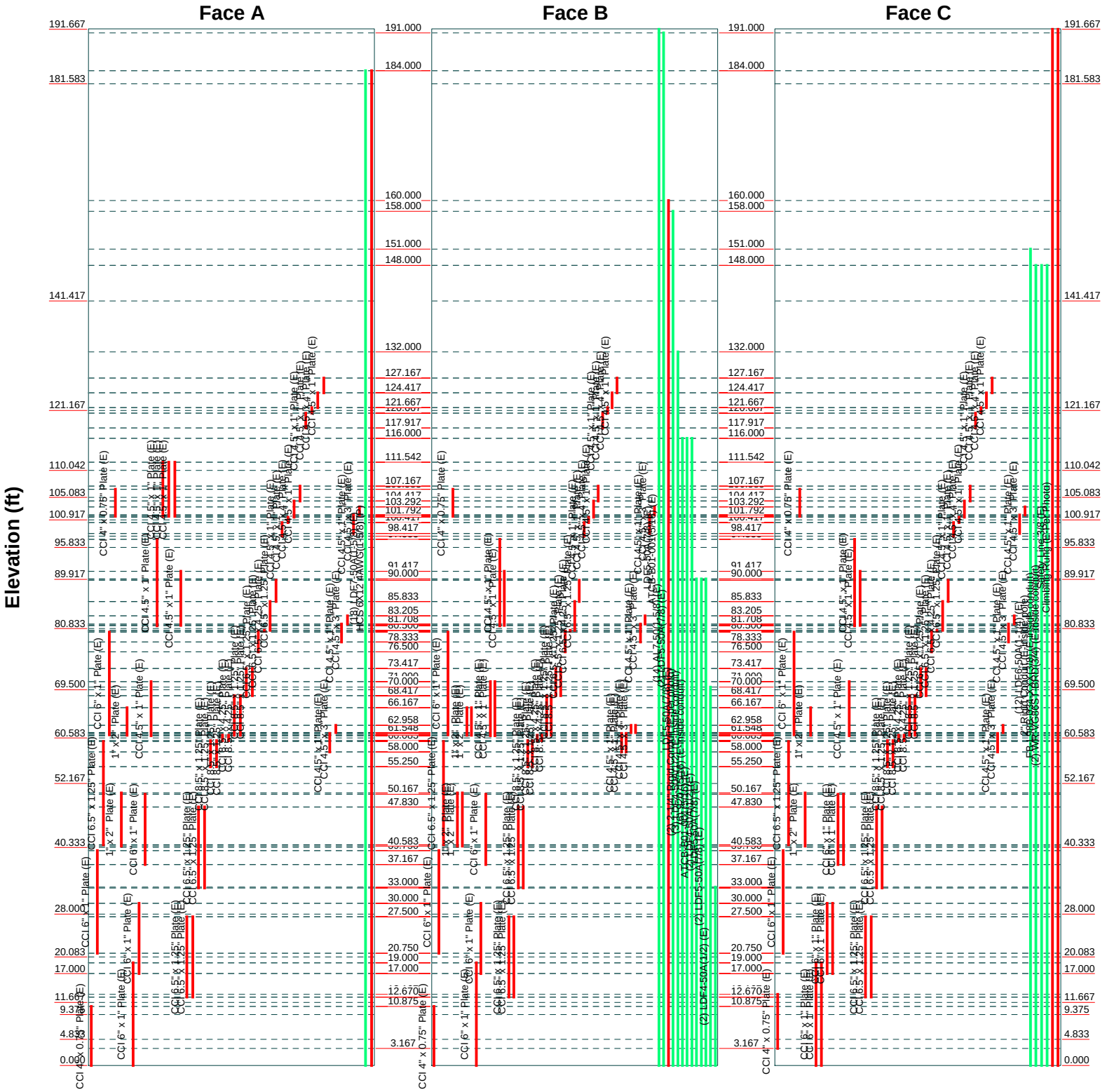
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: *87581.015.01 - Newington_1, CT (BU# 826217*			
Project:			
Client: Crown Castle	Drawn by: Deepak	App'd:	
Code: TIA-222-G	Date: 04/18/17	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart

0' - 191'8"

Round | Flat | App In Face | App Out Face | Truss Leg



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Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 87581.015.01 - Newington_1, CT (BU# 826217			
Project:			
Client: Crown Castle	Drawn by: Deepak	App'd:	
Code: TIA-222-G	Date: 04/18/17	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	191.667-181.583	10.084	P18x3/8	A53-B-42 (42 ksi)	
L2	181.583-141.417	40.166	P24x3/8	A53-B-42 (42 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L3	141.417-121.167	20.250	P36x3/8	A53-B-42 (42 ksi)	
L4	121.167-110.042	11.125	P42x3/8	A53-B-42 (42 ksi)	
L5	110.042-105.083	4.959	P42x3/8 [0.491966]	39.37551ksi (39 ksi)	
L6	105.083-100.917	4.166	P42x3/8 [0.560722]	38.223719ksi (38 ksi)	
L7	100.917-95.833	5.084	P48x3/8	A53-B-42 (42 ksi)	
L8	95.833-89.917	5.916	P48x3/8 [0.478186]	39.626857ksi (40 ksi)	
L9	89.917-80.833	9.084	P48x3/8 [0.578153]	38.103479ksi (38 ksi)	
L10	80.833-69.500	11.333	P54x3/8 [0.487033]	40.19742ksi (40 ksi)	
L11	69.500-60.583	8.917	P54x3/8 [0.591202]	38.531754ksi (39 ksi)	
L12	60.583-52.167	8.416	P60x3/8 [0.514746]	39.917449ksi (40 ksi)	
L13	52.167-40.333	11.834	P60x3/8 [0.620238]	38.170087ksi (38 ksi)	
L14	40.333-28.000	12.333	P60x1/2 [0.597937]	40.659133ksi (41 ksi)	
L15	28.000-20.083	7.917	P60x1/2 [0.720286]	38.6721ksi (39 ksi)	
L16	20.083-17.000	3.083	P60x5/8	A53-B-42 (42 ksi)	
L17	17.000-11.667	5.333	P60x5/8 [0.72746]	40.460872ksi (40 ksi)	
L18	11.667-9.375	2.292	P60x5/8 [0.750143]	39.872566ksi (40 ksi)	
L19	9.375-4.833	4.542	P60x5/8 [0.831253]	36.995527ksi (37 ksi)	
L20	4.833-0.000	4.833	P60x5/8 [0.782103]	38.074682ksi (38 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 191.667-181.583				1	1	1			
L2 181.583-141.417				1	1	1			
L3 141.417-121.167				1	1	1			
L4 121.167-110.042				1	1	1			
L5 110.042-105.083				1	1	1.0455			
L6				1	1	1.04218			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
105.083-100.917									
L7				1	1	1			
100.917-95.833									
L8				1	1	1.03858			
95.833-89.917									
L9				1	1	1.01763			
89.917-80.833									
L10				1	1	0.991923			
80.833-69.500									
L11				1	1	1.00029			
69.500-60.583									
L12				1	1	0.984117			
60.583-52.167									
L13				1	1	1.02572			
52.167-40.333									
L14				1	1	0.999405			
40.333-28.000									
L15				1	1	1.01036			
28.000-20.083									
L16				1	1	1			
20.083-17.000									
L17				1	1	1.03834			
17.000-11.667									
L18				1	1	1.02882			
11.667-9.375									
L19				1	1	0.987983			
9.375-4.833									
L20				1	1	1.02857			
4.833-0.000									

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
*									
* Reinforcement Plates*									
CCI 4" x 0.75" Plate	A	Surface Af	10.875 - 0.000	1	1	0.400	4.000	9.500	0.000
(E)		(CaAa)				0.450			
CCI 4" x 0.75" Plate	B	Surface Af	10.875 - 0.000	1	1	-0.250	4.000	9.500	0.000
(E)		(CaAa)				-0.200			
CCI 4" x 0.75" Plate	C	Surface Af	13.167 - 3.167	1	1	0.250	4.000	9.500	0.000
(E)		(CaAa)				0.300			
d									
CCI 6" x 1" Plate	A	Surface Af	39.750 - 20.750	1	1	0.400	6.000	14.000	0.000
(E)		(CaAa)				0.500			
CCI 6" x 1" Plate	B	Surface Af	39.750 - 20.750	1	1	0.400	6.000	14.000	0.000
(E)		(CaAa)				0.500			
CCI 6" x 1" Plate	C	Surface Af	39.750 - 20.750	1	1	0.400	6.000	14.000	0.000
(E)		(CaAa)				0.500			
d									
CCI 6.5" x 1.25" Plate	A	Surface Af	59.917 - 40.833	1	1	-0.450	6.500	15.500	0.000
(E)		(CaAa)				-0.400			

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
CCI 6.5" x 1.25" Plate (E)	B	Surface Af (CaAa)	59.917 - 40.833	1	1	-0.450 -0.400	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (E)	C	Surface Af (CaAa)	59.917 - 40.833	1	1	-0.400 -0.350	6.500	15.500	0.000
d									
CCI 6" x 1" Plate (E)	A	Surface Af (CaAa)	80.167 - 61.167	1	1	-0.450 -0.400	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	B	Surface Af (CaAa)	80.167 - 61.167	1	1	-0.350 -0.300	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	80.167 - 61.167	1	1	-0.450 -0.400	6.000	14.000	0.000
d									
CCI 4" x 0.75" Plate (E)	A	Surface Af (CaAa)	106.583 - 101.583	1	1	-0.500 -0.450	4.000	9.500	0.000
CCI 4" x 0.75" Plate (E)	B	Surface Af (CaAa)	106.583 - 101.583	1	1	-0.500 -0.450	4.000	9.500	0.000
CCI 4" x 0.75" Plate (E)	C	Surface Af (CaAa)	106.583 - 101.583	1	1	-0.500 -0.450	4.000	9.500	0.000
d									
1" x 2" Plate (E)	A	Surface Af (CaAa)	50.417 - 40.583	1	1	-0.450 -0.400	1.000	6.000	0.007
1" x 2" Plate (E)	B	Surface Af (CaAa)	50.417 - 40.583	1	1	-0.350 -0.300	1.000	6.000	0.007
1" x 2" Plate (E)	B	Surface Af (CaAa)	50.417 - 40.583	1	1	0.200 0.250	1.000	6.000	0.007
1" x 2" Plate (E)	C	Surface Af (CaAa)	50.417 - 40.583	1	1	-0.350 -0.300	1.000	6.000	0.007
d									
1" x 2" Plate (E)	A	Surface Af (CaAa)	66.167 - 61.083	1	1	-0.350 -0.300	1.000	6.000	0.007
1" x 2" Plate (E)	B	Surface Af (CaAa)	66.167 - 61.083	1	1	-0.450 -0.400	1.000	6.000	0.007
1" x 2" Plate (E)	B	Surface Af (CaAa)	66.167 - 61.083	1	1	0.300 0.350	1.000	6.000	0.007
1" x 2" Plate (E)	C	Surface Af (CaAa)	66.167 - 61.083	1	1	-0.450 -0.400	1.000	6.000	0.007
d									
CCI 6" x 1" Plate (E)	A	Surface Af (CaAa)	19.000 - 0.000	1	1	0.300 0.350	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	B	Surface Af (CaAa)	19.000 - 0.000	1	1	0.400 0.450	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	19.000 - 0.000	1	1	0.450 0.500	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	19.000 - 0.000	1	1	-0.500 -0.450	6.000	14.000	0.000
d									
CCI 6" x 1" Plate (E)	A	Surface Af (CaAa)	30.000 - 17.000	1	1	-0.150 -0.100	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	B	Surface Af (CaAa)	30.000 - 17.000	1	1	-0.450 -0.400	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	30.000 - 17.000	1	1	0.350 0.400	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	30.000 - 17.000	1	1	-0.500 -0.450	6.000	14.000	0.000
d									
CCI 6" x 1" Plate (E)	A	Surface Af (CaAa)	50.167 - 37.167	1	1	0.250 0.300	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	B	Surface Af (CaAa)	50.167 - 37.167	1	1	0.100 0.150	6.000	14.000	0.000
CCI 6" x 1" Plate (E)	C	Surface Af (CaAa)	50.167 - 37.167	1	1	-0.400 -0.350	6.000	14.000	0.000

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
CCI 6" x 1" Plate	C	Surface Af	50.167 - 37.167	1	1	0.450	6.000	14.000	0.000
(E)		(CaAa)				0.500			
d									
CCI 4.5" x 1" Plate	A	Surface Af	71.000 - 61.000	1	1	-0.250	4.500	11.000	0.000
(E)		(CaAa)				-0.200			
CCI 4.5" x 1" Plate	B	Surface Af	71.000 - 61.000	1	1	-0.450	4.500	11.000	0.000
(E)		(CaAa)				-0.400			
CCI 4.5" x 1" Plate	B	Surface Af	71.000 - 61.000	1	1	0.400	4.500	11.000	0.000
(E)		(CaAa)				0.450			
CCI 4.5" x 1" Plate	C	Surface Af	71.000 - 61.000	1	1	0.350	4.500	11.000	0.000
(E)		(CaAa)				0.400			
d									
CCI 4.5" x 1" Plate	A	Surface Af	97.333 - 81.333	1	1	-0.500	4.500	11.000	0.000
(E)		(CaAa)				-0.450			
CCI 4.5" x 1" Plate	B	Surface Af	97.333 - 81.333	1	1	-0.500	4.500	11.000	0.000
(E)		(CaAa)				-0.450			
CCI 4.5" x 1" Plate	C	Surface Af	97.333 - 81.333	1	1	-0.500	4.500	11.000	0.000
(E)		(CaAa)				-0.450			
d									
CCI 4.5" x 1" Plate	A	Surface Af	111.542 - 101.542	1	1	-0.350	4.500	11.000	0.000
(E)		(CaAa)				-0.300			
CCI 4.5" x 1" Plate	A	Surface Af	111.542 - 101.542	1	1	-0.350	4.500	11.000	0.000
(E)		(CaAa)				-0.300			
CCI 4.5" x 1" Plate	A	Surface Af	111.542 - 101.542	1	1	-0.350	4.500	11.000	0.000
(E)		(CaAa)				-0.300			
d									
CCI 4.5" x 1" Plate	A	Surface Af	91.417 - 81.417	1	1	-0.150	4.500	11.000	0.000
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	91.417 - 81.417	1	1	-0.150	4.500	11.000	0.000
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	C	Surface Af	91.417 - 81.417	1	1	-0.150	4.500	11.000	0.000
(E)		(CaAa)				-0.100			
d									
* BS*									
CCI 6.5" x 1.25" Plate	A	Surface Af	27.500 - 12.670	1	1	0.400	6.500	15.500	0.028
(E)		(CaAa)				0.450			
CCI 6.5" x 1.25" Plate	A	Surface Af	27.500 - 12.670	1	1	-0.250	6.500	15.500	0.028
(E)		(CaAa)				-0.200			
CCI 6.5" x 1.25" Plate	B	Surface Af	27.500 - 12.670	1	1	0.450	6.500	15.500	0.028
(E)		(CaAa)				0.500			
CCI 6.5" x 1.25" Plate	B	Surface Af	27.500 - 12.670	1	1	-0.250	6.500	15.500	0.028
(E)		(CaAa)				-0.200			
CCI 6.5" x 1.25" Plate	C	Surface Af	27.500 - 12.670	1	1	0.350	6.500	15.500	0.028
(E)		(CaAa)				0.400			
CCI 6.5" x 1.25" Plate	C	Surface Af	27.500 - 12.670	1	1	-0.250	6.500	15.500	0.028
(E)		(CaAa)				-0.200			
d									
CCI 6.5" x 1.25" Plate	A	Surface Af	47.830 - 32.830	1	1	0.400	6.500	15.500	0.028
(E)		(CaAa)				0.450			
CCI 6.5" x 1.25" Plate	A	Surface Af	47.830 - 32.830	1	1	-0.400	6.500	15.500	0.028
(E)		(CaAa)				-0.350			
CCI 6.5" x 1.25" Plate	B	Surface Af	47.830 - 32.830	1	1	-0.400	6.500	15.500	0.028
(E)		(CaAa)				-0.350			
CCI 6.5" x 1.25" Plate	B	Surface Af	47.830 - 32.830	1	1	-0.250	6.500	15.500	0.028
(E)		(CaAa)				-0.200			
CCI 6.5" x 1.25" Plate	C	Surface Af	47.830 - 32.830	1	1	-0.400	6.500	15.500	0.028
(E)		(CaAa)				0.350			
CCI 6.5" x 1.25" Plate	C	Surface Af	47.830 - 32.830	1	1	-0.250	6.500	15.500	0.028
(E)		(CaAa)				-0.200			
d									
CCI 8.5" x 1.25" Plate	A	Surface Af	60.083 - 55.250	1	1	0.200	8.500	19.500	0.036

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
(E)		(CaAa)				0.250			
CCI 8.5" x 1.25" Plate	A	Surface Af	60.083 - 55.250	1	1	-0.400	8.500	19.500	0.036
(E)		(CaAa)				-0.350			
CCI 8.5" x 1.25" Plate	B	Surface Af	60.083 - 55.250	1	1	0.150	8.500	19.500	0.036
(E)		(CaAa)				0.200			
CCI 8.5" x 1.25" Plate	B	Surface Af	60.083 - 55.250	1	1	-0.350	8.500	19.500	0.036
(E)		(CaAa)				-0.300			
CCI 8.5" x 1.25" Plate	C	Surface Af	60.083 - 55.250	1	1	0.100	8.500	19.500	0.036
(E)		(CaAa)				0.150			
CCI 8.5" x 1.25" Plate	C	Surface Af	60.083 - 55.250	1	1	-0.500	8.500	19.500	0.036
(E)		(CaAa)				-0.450			
d									
CCI 8.5" x 1.25" Plate	A	Surface Af	61.083 - 60.083	1	1	0.200	8.500	19.500	0.036
(E)		(CaAa)				0.250			
CCI 8.5" x 1.25" Plate	A	Surface Af	61.083 - 60.083	1	1	-0.400	8.500	19.500	0.036
(E)		(CaAa)				-0.350			
CCI 8.5" x 1.25" Plate	B	Surface Af	61.083 - 60.083	1	1	0.150	8.500	19.500	0.036
(E)		(CaAa)				0.200			
CCI 8.5" x 1.25" Plate	B	Surface Af	61.083 - 60.083	1	1	-0.350	8.500	19.500	0.036
(E)		(CaAa)				-0.300			
CCI 8.5" x 1.25" Plate	C	Surface Af	61.083 - 60.083	1	1	0.100	8.500	19.500	0.036
(E)		(CaAa)				0.150			
CCI 8.5" x 1.25" Plate	C	Surface Af	61.083 - 60.083	1	1	-0.500	8.500	19.500	0.036
(E)		(CaAa)				-0.450			
d									
CCI 8.5" x 4.25" Plate	A	Surface Af	68.417 - 61.083	1	1	0.200	8.500	25.500	0.123
(E)		(CaAa)				0.250			
CCI 8.5" x 4.25" Plate	A	Surface Af	68.417 - 61.083	1	1	-0.400	8.500	25.500	0.123
(E)		(CaAa)				-0.350			
CCI 8.5" x 4.25" Plate	B	Surface Af	68.417 - 61.083	1	1	0.150	8.500	25.500	0.123
(E)		(CaAa)				0.200			
CCI 8.5" x 4.25" Plate	B	Surface Af	68.417 - 61.083	1	1	-0.350	8.500	25.500	0.123
(E)		(CaAa)				-0.300			
CCI 8.5" x 4.25" Plate	C	Surface Af	68.417 - 61.083	1	1	0.100	8.500	25.500	0.123
(E)		(CaAa)				0.150			
CCI 8.5" x 4.25" Plate	C	Surface Af	68.417 - 61.083	1	1	-0.500	8.500	25.500	0.123
(E)		(CaAa)				-0.450			
d									
CCI 8.5" x 1.25" Plate	A	Surface Af	73.417 - 68.417	1	1	0.200	8.500	19.500	0.036
(E)		(CaAa)				0.250			
CCI 8.5" x 1.25" Plate	A	Surface Af	73.417 - 68.417	1	1	-0.400	8.500	19.500	0.036
(E)		(CaAa)				-0.350			
CCI 8.5" x 1.25" Plate	B	Surface Af	73.417 - 68.417	1	1	0.150	8.500	19.500	0.036
(E)		(CaAa)				0.200			
CCI 8.5" x 1.25" Plate	B	Surface Af	73.417 - 68.417	1	1	-0.350	8.500	19.500	0.036
(E)		(CaAa)				-0.300			
CCI 8.5" x 1.25" Plate	C	Surface Af	73.417 - 68.417	1	1	0.100	8.500	19.500	0.036
(E)		(CaAa)				0.150			
CCI 8.5" x 1.25" Plate	C	Surface Af	73.417 - 68.417	1	1	-0.500	8.500	19.500	0.036
(E)		(CaAa)				-0.450			
d									
CCI 6.5" x 1.25" Plate	A	Surface Af	80.333 - 76.500	1	1	0.050	6.500	15.500	0.028
(E)		(CaAa)				0.100			
CCI 6.5" x 1.25" Plate	B	Surface Af	80.333 - 76.500	1	1	0.000	6.500	15.500	0.028
(E)		(CaAa)				0.050			
CCI 6.5" x 1.25" Plate	C	Surface Af	80.333 - 76.500	1	1	0.150	6.500	15.500	0.028
(E)		(CaAa)				0.200			
d									
CCI 6.5" x 1.25" Plate	A	Surface Af	80.500 - 80.333	1	1	0.050	6.500	15.500	0.028
(E)		(CaAa)				0.100			
CCI 6.5" x 1.25" Plate	B	Surface Af	80.500 - 80.333	1	1	0.000	6.500	15.500	0.028

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
(E)		(CaAa)				0.050			
CCI 6.5" x 1.25" Plate	C	Surface Af	80.500 - 80.333	1	1	0.150	6.500	15.500	0.028
(E)		(CaAa)				0.200			
d									
CCI 6.5" x 4.25" Plate	A	Surface Af	85.833 - 80.500	1	1	0.050	6.500	21.500	0.094
(E)		(CaAa)				0.100			
CCI 6.5" x 4.25" Plate	B	Surface Af	85.833 - 80.500	1	1	0.000	6.500	21.500	0.094
(E)		(CaAa)				0.050			
CCI 6.5" x 4.25" Plate	C	Surface Af	85.833 - 80.500	1	1	0.150	6.500	21.500	0.094
(E)		(CaAa)				0.200			
d									
CCI 6.5" x 1.25" Plate	A	Surface Af	89.750 - 85.833	1	1	0.050	6.500	15.500	0.028
(E)		(CaAa)				0.100			
CCI 6.5" x 1.25" Plate	B	Surface Af	89.750 - 85.833	1	1	0.000	6.500	15.500	0.028
(E)		(CaAa)				0.050			
CCI 6.5" x 1.25" Plate	C	Surface Af	89.750 - 85.833	1	1	0.150	6.500	15.500	0.028
(E)		(CaAa)				0.200			
d									
CCI 4.5" x 1" Plate	A	Surface Af	100.417 - 97.917	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	100.417 - 97.917	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	100.417 - 97.917	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
d									
CCI 4.5" x 1" Plate	A	Surface Af	101.417 - 100.417	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	101.417 - 100.417	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	101.417 - 100.417	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
d									
CCI 4.5" x 4" Plate	A	Surface Af	104.417 - 101.417	1	1	-0.150	4.500	17.000	0.061
(E)		(CaAa)				-0.100			
CCI 4.5" x 4" Plate	B	Surface Af	104.417 - 101.417	1	1	-0.100	4.500	17.000	0.061
(E)		(CaAa)				-0.050			
CCI 4.5" x 4" Plate	C	Surface Af	104.417 - 101.417	1	1	-0.100	4.500	17.000	0.061
(E)		(CaAa)				-0.050			
d									
CCI 4.5" x 1" Plate	A	Surface Af	107.167 - 104.417	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	107.167 - 104.417	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	107.167 - 104.417	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
d									
CCI 4.5" x 1" Plate	A	Surface Af	120.667 - 117.917	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	120.667 - 117.917	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	120.667 - 117.917	1	1	-0.200	4.500	11.000	0.015
(E)		(CaAa)				-0.150			
d									
CCI 4.5" x 1" Plate	A	Surface Af	121.667 - 120.667	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	121.667 - 120.667	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	121.667 - 120.667	1	1	-0.200	4.500	11.000	0.015
(E)		(CaAa)				-0.150			
d									
CCI 4.5" x 4" Plate	A	Surface Af	124.417 - 121.667	1	1	-0.150	4.500	17.000	0.061

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
(E)		(CaAa)				-0.100			
CCI 4.5" x 4" Plate	B	Surface Af	124.417 - 121.667	1	1	-0.100	4.500	17.000	0.061
(E)		(CaAa)				-0.050			
CCI 4.5" x 4" Plate	C	Surface Af	124.417 - 121.667	1	1	-0.200	4.500	17.000	0.061
(E)		(CaAa)				-0.150			
d									
CCI 4.5" x 1" Plate	A	Surface Af	127.167 - 124.417	1	1	-0.150	4.500	11.000	0.015
(E)		(CaAa)				-0.100			
CCI 4.5" x 1" Plate	B	Surface Af	127.167 - 124.417	1	1	-0.100	4.500	11.000	0.015
(E)		(CaAa)				-0.050			
CCI 4.5" x 1" Plate	C	Surface Af	127.167 - 124.417	1	1	-0.200	4.500	11.000	0.015
(E)		(CaAa)				-0.150			
d									
CCI 4.5" x 1" Plate	A	Surface Af	61.458 - 58.000	1	1	-0.250	4.500	11.000	0.015
(E)		(CaAa)				-0.200			
CCI 4.5" x 1" Plate	B	Surface Af	61.458 - 58.000	1	1	-0.450	4.500	11.000	0.015
(E)		(CaAa)				-0.400			
CCI 4.5" x 1" Plate	B	Surface Af	61.458 - 58.000	1	1	0.400	4.500	11.000	0.015
(E)		(CaAa)				0.450			
CCI 4.5" x 1" Plate	C	Surface Af	61.458 - 58.000	1	1	0.350	4.500	11.000	0.015
(E)		(CaAa)				0.400			
d									
CCI 4.5" x 3" Plate	A	Surface Af	62.958 - 61.548	1	1	-0.250	4.500	15.000	0.046
(E)		(CaAa)				-0.200			
CCI 4.5" x 3" Plate	B	Surface Af	62.958 - 61.548	1	1	-0.450	4.500	15.000	0.046
(E)		(CaAa)				-0.400			
CCI 4.5" x 3" Plate	B	Surface Af	62.958 - 61.548	1	1	0.400	4.500	15.000	0.046
(E)		(CaAa)				0.450			
CCI 4.5" x 3" Plate	C	Surface Af	62.958 - 61.548	1	1	0.350	4.500	15.000	0.046
(E)		(CaAa)				0.400			
d									
CCI 4.5" x 1" Plate	A	Surface Af	81.708 - 78.333	1	1	-0.500	4.500	11.000	0.015
(E)		(CaAa)				-0.450			
CCI 4.5" x 1" Plate	B	Surface Af	81.708 - 78.333	1	1	-0.500	4.500	11.000	0.015
(E)		(CaAa)				-0.450			
CCI 4.5" x 1" Plate	C	Surface Af	81.708 - 78.333	1	1	-0.500	4.500	11.000	0.015
(E)		(CaAa)				-0.450			
d									
CCI 4.5" x 3" Plate	A	Surface Af	83.205 - 81.708	1	1	-0.500	4.500	15.000	0.046
(E)		(CaAa)				-0.450			
CCI 4.5" x 3" Plate	B	Surface Af	83.205 - 81.708	1	1	-0.500	4.500	15.000	0.046
(E)		(CaAa)				-0.450			
CCI 4.5" x 3" Plate	C	Surface Af	83.205 - 81.708	1	1	-0.500	4.500	15.000	0.046
(E)		(CaAa)				-0.450			
d									
CCI 4.5" x 1" Plate	A	Surface Af	101.792 - 98.417	1	1	0.300	4.500	11.000	0.015
(E)		(CaAa)				0.350			
CCI 4.5" x 1" Plate	B	Surface Af	101.792 - 98.417	1	1	0.300	4.500	11.000	0.015
(E)		(CaAa)				0.350			
CCI 4.5" x 1" Plate	C	Surface Af	101.792 - 98.417	1	1	0.300	4.500	11.000	0.015
(E)		(CaAa)				0.350			
d									
CCI 4.5" x 3" Plate	A	Surface Af	103.292 - 101.792	1	1	0.300	4.500	15.000	0.046
(E)		(CaAa)				0.350			
CCI 4.5" x 3" Plate	B	Surface Af	103.292 - 101.792	1	1	0.300	4.500	15.000	0.046
(E)		(CaAa)				0.350			
CCI 4.5" x 3" Plate	C	Surface Af	103.292 - 101.792	1	1	0.300	4.500	15.000	0.046
(E)		(CaAa)				0.350			
HCS 6X12 4AWG(1-5/8)	A	Surface Ar	184.000 - 0.000	1	1	-0.400	1.660		0.002
(P)		(CaAa)				-0.360			
d									

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
AL7-50(1-5/8) (E) **d**	B	Surface Ar (CaAa)	160.000 - 0.000	14	12	-0.150 0.300	1.960		0.001
Safety Line 3/8 (E)	C	Surface Ar (CaAa)	191.667 - 0.000	1	1	0.000 0.010	0.375		0.000
Climbing Rung (E-Per Photo) **d**	C	Surface Ar (CaAa)	191.667 - 0.000	1	1	-0.050 0.050	1.000		0.008

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
*								
d								
d								
LDF5-50A(7/8) (E)	B	No	Inside Pole	191.667 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
d								
ATCB-B01-001(5/16) (E)	B	No	Inside Pole	191.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
d								
LDF7-50A(1-5/8) (E)	A	No	Inside Pole	184.000 - 0.000	18	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
d								
LDF5-50A(7/8) (E)	B	No	Inside Pole	158.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
d								
LDF6-50A(1-1/4) (E)	C	No	Inside Pole	151.000 - 0.000	12	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
2" Rigid Conduit (E-inside pole)	C	No	Inside Pole	148.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.003 0.003 0.003
FB-L98B-034-XXX(3/8) (E-inside conduit)	C	No	Inside Pole	148.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
WR-VG86ST-BRD(3/4) (E-inside conduit)	C	No	Inside Pole	148.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.001 0.001 0.001
d								
LDF5-50A(7/8) (E)	B	No	Inside Pole	132.000 - 0.000	1	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
d								
2-1/4" Rigid Conduit (E-per photo)	B	No	Inside Pole	116.000 - 0.000	2	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.003 0.003 0.003
LDF4-50A(1/2) (E-inside conduit)	B	No	Inside Pole	116.000 - 0.000	3	No Ice 1/2" Ice 1" Ice	0.000 0.000 0.000	0.000 0.000 0.000
9207(5/16) (E-inside conduit)	B	No	Inside Pole	116.000 - 0.000	6	No Ice 1/2" Ice	0.000 0.000	0.001 0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.001
d								
ATCB-B01-001(5/16) (E)	B	No	Inside Pole	90.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF4-50A(1/2) (E)	B	No	Inside Pole	90.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
LDF5-50A(7/8) (E)	B	No	Inside Pole	90.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
d								
LDF5-50A(7/8) (E)	B	No	Inside Pole	70.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
d								
LDF4-50A(1/2) (E)	B	No	Inside Pole	33.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
d								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	191.667-181.583	A	0.000	0.000	0.401	0.000	0.041
		B	0.000	0.000	0.000	0.000	0.004
		C	0.000	0.000	1.387	0.000	0.087
L2	181.583-141.417	A	0.000	0.000	6.668	0.000	0.689
		B	0.000	0.000	43.707	0.000	0.162
		C	0.000	0.000	5.523	0.000	0.442
L3	141.417-121.167	A	0.000	0.000	7.862	0.000	0.566
		B	0.000	0.000	52.128	0.000	0.391
		C	0.000	0.000	7.284	0.000	0.620
L4	121.167-110.042	A	0.000	0.000	7.659	0.000	0.241
		B	0.000	0.000	28.604	0.000	0.206
		C	0.000	0.000	3.967	0.000	0.271
L5	110.042-105.083	A	0.000	0.000	14.544	0.000	0.117
		B	0.000	0.000	14.227	0.000	0.125
		C	0.000	0.000	3.245	0.000	0.130
L6	105.083-100.917	A	0.000	0.000	15.898	0.000	0.355
		B	0.000	0.000	17.038	0.000	0.362
		C	0.000	0.000	7.812	0.000	0.367
L7	100.917-95.833	A	0.000	0.000	6.094	0.000	0.172
		B	0.000	0.000	17.208	0.000	0.180
		C	0.000	0.000	5.949	0.000	0.185
L8	95.833-89.917	A	0.000	0.000	6.544	0.000	0.102
		B	0.000	0.000	19.476	0.000	0.111
		C	0.000	0.000	6.375	0.000	0.117
L9	89.917-80.833	A	0.000	0.000	25.760	0.000	0.816
		B	0.000	0.000	45.618	0.000	0.837
		C	0.000	0.000	25.501	0.000	0.841
L10	80.833-69.500	A	0.000	0.000	31.341	0.000	0.658
		B	0.000	0.000	57.239	0.000	0.684
		C	0.000	0.000	31.018	0.000	0.688
L11	69.500-60.583	A	0.000	0.000	44.014	0.000	2.184
		B	0.000	0.000	72.443	0.000	2.323

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	43.760	0.000	2.208
L12	60.583-52.167	A	0.000	0.000	26.840	0.000	0.570
		B	0.000	0.000	47.175	0.000	0.634
		C	0.000	0.000	26.600	0.000	0.592
L13	52.167-40.333	A	0.000	0.000	41.959	0.000	0.685
		B	0.000	0.000	69.468	0.000	0.786
		C	0.000	0.000	51.456	0.000	0.716
L14	40.333-28.000	A	0.000	0.000	35.220	0.000	0.627
		B	0.000	0.000	62.180	0.000	0.664
		C	0.000	0.000	40.034	0.000	0.660
L15	28.000-20.083	A	0.000	0.000	32.551	0.000	0.546
		B	0.000	0.000	49.858	0.000	0.572
		C	0.000	0.000	40.243	0.000	0.567
L16	20.083-17.000	A	0.000	0.000	12.275	0.000	0.223
		B	0.000	0.000	19.014	0.000	0.233
		C	0.000	0.000	17.270	0.000	0.232
L17	17.000-11.667	A	0.000	0.000	15.600	0.000	0.331
		B	0.000	0.000	27.258	0.000	0.348
		C	0.000	0.000	21.781	0.000	0.345
L18	11.667-9.375	A	0.000	0.000	3.672	0.000	0.039
		B	0.000	0.000	8.683	0.000	0.047
		C	0.000	0.000	6.427	0.000	0.045
L19	9.375-4.833	A	0.000	0.000	8.324	0.000	0.078
		B	0.000	0.000	18.253	0.000	0.093
		C	0.000	0.000	12.737	0.000	0.090
L20	4.833-0.000	A	0.000	0.000	8.857	0.000	0.083
		B	0.000	0.000	19.422	0.000	0.099
		C	0.000	0.000	11.441	0.000	0.096

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	191.667-181.583	A	2.378	0.000	0.000	1.551	0.000	0.070
		B		0.000	0.000	0.000	0.000	0.004
		C		0.000	0.000	10.980	0.000	0.267
L2	181.583-141.417	A	2.344	0.000	0.000	25.501	0.000	1.150
		B		0.000	0.000	65.526	0.000	1.310
		C		0.000	0.000	43.190	0.000	1.139
L3	141.417-121.167	A	2.296	0.000	0.000	17.253	0.000	0.911
		B		0.000	0.000	75.751	0.000	1.736
		C		0.000	0.000	25.975	0.000	1.079
L4	121.167-110.042	A	2.267	0.000	0.000	13.862	0.000	0.496
		B		0.000	0.000	41.478	0.000	0.927
		C		0.000	0.000	14.084	0.000	0.509
L5	110.042-105.083	A	2.251	0.000	0.000	20.710	0.000	0.484
		B		0.000	0.000	20.155	0.000	0.478
		C		0.000	0.000	7.931	0.000	0.270
L6	105.083-100.917	A	2.241	0.000	0.000	20.889	0.000	0.767
		B		0.000	0.000	22.305	0.000	0.795
		C		0.000	0.000	12.030	0.000	0.620
L7	100.917-95.833	A	2.231	0.000	0.000	9.072	0.000	0.344
		B		0.000	0.000	23.743	0.000	0.596
		C		0.000	0.000	11.196	0.000	0.384
L8	95.833-89.917	A	2.218	0.000	0.000	12.016	0.000	0.288
		B		0.000	0.000	29.083	0.000	0.581
		C		0.000	0.000	14.471	0.000	0.335

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L9	89.917-80.833	A	2.199	0.000	0.000	34.838	0.000	1.445
		B		0.000	0.000	61.036	0.000	1.898
		C		0.000	0.000	38.575	0.000	1.516
L10	80.833-69.500	A	2.172	0.000	0.000	39.147	0.000	1.310
		B		0.000	0.000	73.302	0.000	1.894
		C		0.000	0.000	43.746	0.000	1.397
L11	69.500-60.583	A	2.140	0.000	0.000	52.346	0.000	3.144
		B		0.000	0.000	90.507	0.000	3.934
		C		0.000	0.000	55.909	0.000	3.212
L12	60.583-52.167	A	2.110	0.000	0.000	31.157	0.000	1.082
		B		0.000	0.000	57.398	0.000	1.573
		C		0.000	0.000	34.469	0.000	1.144
L13	52.167-40.333	A	2.069	0.000	0.000	61.398	0.000	1.572
		B		0.000	0.000	101.065	0.000	2.318
		C		0.000	0.000	78.040	0.000	1.830
L14	40.333-28.000	A	2.007	0.000	0.000	49.683	0.000	1.293
		B		0.000	0.000	85.133	0.000	1.873
		C		0.000	0.000	60.598	0.000	1.465
L15	28.000-20.083	A	1.938	0.000	0.000	43.637	0.000	1.113
		B		0.000	0.000	66.366	0.000	1.476
		C		0.000	0.000	56.103	0.000	1.292
L16	20.083-17.000	A	1.888	0.000	0.000	16.283	0.000	0.430
		B		0.000	0.000	25.126	0.000	0.569
		C		0.000	0.000	23.829	0.000	0.529
L17	17.000-11.667	A	1.840	0.000	0.000	21.492	0.000	0.592
		B		0.000	0.000	36.777	0.000	0.827
		C		0.000	0.000	31.920	0.000	0.723
L18	11.667-9.375	A	1.784	0.000	0.000	5.689	0.000	0.106
		B		0.000	0.000	12.252	0.000	0.205
		C		0.000	0.000	10.212	0.000	0.162
L19	9.375-4.833	A	1.715	0.000	0.000	12.588	0.000	0.221
		B		0.000	0.000	25.577	0.000	0.410
		C		0.000	0.000	19.979	0.000	0.309
L20	4.833-0.000	A	1.540	0.000	0.000	12.987	0.000	0.214
		B		0.000	0.000	26.766	0.000	0.400
		C		0.000	0.000	17.746	0.000	0.266

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	191.667-181.583	-0.057	0.209	-0.120	0.843
L2	181.583-141.417	0.922	-0.244	0.569	0.290
L3	141.417-121.167	1.701	-0.537	1.407	-0.071
L4	121.167-110.042	1.529	-0.366	1.306	0.083
L5	110.042-105.083	0.112	0.590	0.098	0.833
L6	105.083-100.917	0.198	0.372	0.193	0.595
L7	100.917-95.833	1.368	-0.399	1.279	-0.031
L8	95.833-89.917	1.421	-0.468	1.223	-0.068
L9	89.917-80.833	0.714	-0.457	0.750	-0.159
L10	80.833-69.500	1.150	-0.480	1.160	-0.162
L11	69.500-60.583	0.489	-0.241	0.484	-0.000
L12	60.583-52.167	0.989	-0.337	1.009	-0.029
L13	52.167-40.333	1.396	-0.765	1.385	-0.399
L14	40.333-28.000	1.192	-0.792	1.144	-0.488
L15	28.000-20.083	0.183	-0.575	0.229	-0.354

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L16	20.083-17.000	0.386	-0.679	0.444	-0.472
L17	17.000-11.667	1.234	-0.356	1.223	-0.148
L18	11.667-9.375	1.584	-1.045	1.515	-0.760
L19	9.375-4.833	1.639	-1.292	1.580	-1.029
L20	4.833-0.000	1.944	-1.471	1.898	-1.226

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	187	HCS 6X12 4AWG(1-5/8)	181.58 - 184.00	1.0000	1.0000
L1	213	Safety Line 3/8	181.58 - 191.67	1.0000	1.0000
L1	214	Climbing Rung	181.58 - 191.67	1.0000	1.0000
L2	187	HCS 6X12 4AWG(1-5/8)	141.42 - 181.58	1.0000	1.0000
L2	189	AL7-50(1-5/8)	141.42 - 160.00	1.0000	1.0000
L2	213	Safety Line 3/8	141.42 - 181.58	1.0000	1.0000
L2	214	Climbing Rung	141.42 - 181.58	1.0000	1.0000
L3	144	CCI 4.5" x 1" Plate	121.17 - 121.67	1.0000	1.0000
L3	145	CCI 4.5" x 1" Plate	121.17 - 121.67	1.0000	1.0000
L3	146	CCI 4.5" x 1" Plate	121.17 - 121.67	1.0000	1.0000
L3	148	CCI 4.5" x 4" Plate	121.67 - 124.42	1.0000	1.0000
L3	149	CCI 4.5" x 4" Plate	121.67 - 124.42	1.0000	1.0000
L3	150	CCI 4.5" x 4" Plate	121.67 - 124.42	1.0000	1.0000
L3	152	CCI 4.5" x 1" Plate	124.42 - 127.17	1.0000	1.0000
L3	153	CCI 4.5" x 1" Plate	124.42 - 127.17	1.0000	1.0000
L3	154	CCI 4.5" x 1" Plate	124.42 - 127.17	1.0000	1.0000
L3	187	HCS 6X12 4AWG(1-5/8)	121.17 - 141.42	1.0000	1.0000
L3	189	AL7-50(1-5/8)	121.17 - 141.42	1.0000	1.0000
L3	213	Safety Line 3/8	121.17 - 141.42	1.0000	1.0000
L3	214	Climbing Rung	121.17 - 141.42	1.0000	1.0000
L4	57	CCI 4.5" x 1" Plate	110.04 - 111.54	1.0000	1.0000
L4	58	CCI 4.5" x 1" Plate	110.04 - 111.54	1.0000	1.0000
L4	59	CCI 4.5" x 1" Plate	110.04 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L4	140	CCI 4.5" x 1" Plate	111.54 - 117.92	1.0000	1.0000
L4	141	CCI 4.5" x 1" Plate	117.92 - 120.67	1.0000	1.0000
L4	142	CCI 4.5" x 1" Plate	117.92 - 120.67	1.0000	1.0000
L4	144	CCI 4.5" x 1" Plate	120.67 - 121.17	1.0000	1.0000
L4	145	CCI 4.5" x 1" Plate	120.67 - 121.17	1.0000	1.0000
L4	146	CCI 4.5" x 1" Plate	120.67 - 121.17	1.0000	1.0000
L4	187	HCS 6X12 4AWG(1-5/8)	110.04 - 121.17	1.0000	1.0000
L4	189	AL7-50(1-5/8)	110.04 - 121.17	1.0000	1.0000
L4	213	Safety Line 3/8	110.04 - 121.17	1.0000	1.0000
L4	214	Climbing Rung	110.04 - 121.17	1.0000	1.0000
L5	19	CCI 4" x 0.75" Plate	105.08 - 106.58	1.0000	1.0000
L5	20	CCI 4" x 0.75" Plate	105.08 - 106.58	1.0000	1.0000
L5	21	CCI 4" x 0.75" Plate	105.08 - 106.58	1.0000	1.0000
L5	57	CCI 4.5" x 1" Plate	105.08 - 110.04	1.0000	1.0000
L5	58	CCI 4.5" x 1" Plate	105.08 - 110.04	1.0000	1.0000
L5	59	CCI 4.5" x 1" Plate	105.08 - 110.04	1.0000	1.0000
L5	136	CCI 4.5" x 1" Plate	105.08 - 107.17	1.0000	1.0000
L5	137	CCI 4.5" x 1" Plate	105.08 - 107.17	1.0000	1.0000
L5	138	CCI 4.5" x 1" Plate	105.08 - 107.17	1.0000	1.0000
L5	187	HCS 6X12 4AWG(1-5/8)	105.08 - 110.04	1.0000	1.0000
L5	189	AL7-50(1-5/8)	105.08 - 110.04	1.0000	1.0000
L5	213	Safety Line 3/8	105.08 - 110.04	1.0000	1.0000
L5	214	Climbing Rung	105.08 - 110.04	1.0000	1.0000
L6	19	CCI 4" x 0.75" Plate	101.58 - 105.08	1.0000	1.0000
L6	20	CCI 4" x 0.75" Plate	101.58 - 105.08	1.0000	1.0000
L6	21	CCI 4" x 0.75" Plate	101.58 - 105.08	1.0000	1.0000
L6	57	CCI 4.5" x 1" Plate	101.54 - 105.08	1.0000	1.0000
L6	58	CCI 4.5" x 1" Plate	101.54 - 105.08	1.0000	1.0000
L6	59	CCI 4.5" x 1" Plate	101.54 - 105.08	1.0000	1.0000
L6	128	CCI 4.5" x 1" Plate	100.92 - 101.42	1.0000	1.0000
L6	129	CCI 4.5" x 1" Plate	100.92 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			101.42		
L6	130	CCI 4.5" x 1" Plate	100.92 - 101.42	1.0000	1.0000
L6	132	CCI 4.5" x 4" Plate	101.42 - 104.42	1.0000	1.0000
L6	133	CCI 4.5" x 4" Plate	101.42 - 104.42	1.0000	1.0000
L6	134	CCI 4.5" x 4" Plate	101.42 - 104.42	1.0000	1.0000
L6	136	CCI 4.5" x 1" Plate	104.42 - 105.08	1.0000	1.0000
L6	137	CCI 4.5" x 1" Plate	104.42 - 105.08	1.0000	1.0000
L6	138	CCI 4.5" x 1" Plate	104.42 - 105.08	1.0000	1.0000
L6	174	CCI 4.5" x 1" Plate	100.92 - 101.79	1.0000	1.0000
L6	175	CCI 4.5" x 1" Plate	100.92 - 101.79	1.0000	1.0000
L6	176	CCI 4.5" x 1" Plate	100.92 - 101.79	1.0000	1.0000
L6	178	CCI 4.5" x 3" Plate	101.79 - 103.29	1.0000	1.0000
L6	179	CCI 4.5" x 3" Plate	101.79 - 103.29	1.0000	1.0000
L6	180	CCI 4.5" x 3" Plate	101.79 - 103.29	1.0000	1.0000
L6	187	HCS 6X12 4AWG(1-5/8)	100.92 - 105.08	1.0000	1.0000
L6	189	AL7-50(1-5/8)	100.92 - 105.08	1.0000	1.0000
L6	213	Safety Line 3/8	100.92 - 105.08	1.0000	1.0000
L6	214	Climbing Rung	100.92 - 105.08	1.0000	1.0000
L7	53	CCI 4.5" x 1" Plate	95.83 - 97.33	1.0000	1.0000
L7	54	CCI 4.5" x 1" Plate	95.83 - 97.33	1.0000	1.0000
L7	55	CCI 4.5" x 1" Plate	95.83 - 97.33	1.0000	1.0000
L7	124	CCI 4.5" x 1" Plate	97.92 - 100.42	1.0000	1.0000
L7	125	CCI 4.5" x 1" Plate	97.92 - 100.42	1.0000	1.0000
L7	126	CCI 4.5" x 1" Plate	97.92 - 100.42	1.0000	1.0000
L7	128	CCI 4.5" x 1" Plate	100.42 - 100.92	1.0000	1.0000
L7	129	CCI 4.5" x 1" Plate	100.42 - 100.92	1.0000	1.0000
L7	130	CCI 4.5" x 1" Plate	100.42 - 100.92	1.0000	1.0000
L7	174	CCI 4.5" x 1" Plate	98.42 - 100.92	1.0000	1.0000
L7	175	CCI 4.5" x 1" Plate	98.42 - 100.92	1.0000	1.0000
L7	176	CCI 4.5" x 1" Plate	98.42 - 100.92	1.0000	1.0000
L7	187	HCS 6X12 4AWG(1-5/8)	95.83 - 100.92	1.0000	1.0000
L7	189	AL7-50(1-5/8)	95.83 - 100.92	1.0000	1.0000
L7	213	Safety Line 3/8	95.83 - 100.92	1.0000	1.0000
L7	214	Climbing Rung	95.83 - 100.92	1.0000	1.0000
L8	53	CCI 4.5" x 1" Plate	89.92 - 95.83	1.0000	1.0000
L8	54	CCI 4.5" x 1" Plate	89.92 - 95.83	1.0000	1.0000
L8	55	CCI 4.5" x 1" Plate	89.92 - 95.83	1.0000	1.0000
L8	61	CCI 4.5" x 1" Plate	89.92 - 91.42	1.0000	1.0000
L8	62	CCI 4.5" x 1" Plate	89.92 - 91.42	1.0000	1.0000
L8	63	CCI 4.5" x 1" Plate	89.92 - 91.42	1.0000	1.0000
L8	187	HCS 6X12 4AWG(1-5/8)	89.92 - 95.83	1.0000	1.0000
L8	189	AL7-50(1-5/8)	89.92 - 95.83	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L8	213	Safety Line 3/8	89.92 - 95.83	1.0000	1.0000
L8	214	Climbing Rung	89.92 - 95.83	1.0000	1.0000
L9	53	CCI 4.5" x 1" Plate	81.33 - 89.92	1.0000	1.0000
L9	54	CCI 4.5" x 1" Plate	81.33 - 89.92	1.0000	1.0000
L9	55	CCI 4.5" x 1" Plate	81.33 - 89.92	1.0000	1.0000
L9	61	CCI 4.5" x 1" Plate	81.42 - 89.92	1.0000	1.0000
L9	62	CCI 4.5" x 1" Plate	81.42 - 89.92	1.0000	1.0000
L9	63	CCI 4.5" x 1" Plate	81.42 - 89.92	1.0000	1.0000
L9	116	CCI 6.5" x 4.25" Plate	80.83 - 85.83	1.0000	1.0000
L9	117	CCI 6.5" x 4.25" Plate	80.83 - 85.83	1.0000	1.0000
L9	118	CCI 6.5" x 4.25" Plate	80.83 - 85.83	1.0000	1.0000
L9	120	CCI 6.5" x 1.25" Plate	85.83 - 89.75	1.0000	1.0000
L9	121	CCI 6.5" x 1.25" Plate	85.83 - 89.75	1.0000	1.0000
L9	122	CCI 6.5" x 1.25" Plate	85.83 - 89.75	1.0000	1.0000
L9	166	CCI 4.5" x 1" Plate	80.83 - 81.71	1.0000	1.0000
L9	167	CCI 4.5" x 1" Plate	80.83 - 81.71	1.0000	1.0000
L9	168	CCI 4.5" x 1" Plate	80.83 - 81.71	1.0000	1.0000
L9	170	CCI 4.5" x 3" Plate	81.71 - 83.20	1.0000	1.0000
L9	171	CCI 4.5" x 3" Plate	81.71 - 83.20	1.0000	1.0000
L9	172	CCI 4.5" x 3" Plate	81.71 - 83.20	1.0000	1.0000
L9	187	HCS 6X12 4AWG(1-5/8)	80.83 - 89.92	1.0000	1.0000
L9	189	AL7-50(1-5/8)	80.83 - 89.92	1.0000	1.0000
L9	213	Safety Line 3/8	80.83 - 89.92	1.0000	1.0000
L9	214	Climbing Rung	80.83 - 89.92	1.0000	1.0000
L10	15	CCI 6" x 1" Plate	69.50 - 80.17	1.0000	1.0000
L10	16	CCI 6" x 1" Plate	69.50 - 80.17	1.0000	1.0000
L10	17	CCI 6" x 1" Plate	69.50 - 80.17	1.0000	1.0000
L10	48	CCI 4.5" x 1" Plate	69.50 - 71.00	1.0000	1.0000
L10	49	CCI 4.5" x 1" Plate	69.50 - 71.00	1.0000	1.0000
L10	50	CCI 4.5" x 1" Plate	69.50 - 71.00	1.0000	1.0000
L10	51	CCI 4.5" x 1" Plate	69.50 - 71.00	1.0000	1.0000
L10	101	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	102	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	103	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	104	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	105	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	106	CCI 8.5" x 1.25" Plate	69.50 - 73.42	1.0000	1.0000
L10	108	CCI 6.5" x 1.25" Plate	76.50 - 80.33	1.0000	1.0000
L10	109	CCI 6.5" x 1.25" Plate	76.50 - 80.33	1.0000	1.0000
L10	110	CCI 6.5" x 1.25" Plate	76.50 - 80.33	1.0000	1.0000
L10	112	CCI 6.5" x 1.25" Plate	80.33 - 80.50	1.0000	1.0000
L10	113	CCI 6.5" x 1.25" Plate	80.33 - 80.50	1.0000	1.0000
L10	114	CCI 6.5" x 1.25" Plate	80.33 - 80.50	1.0000	1.0000
L10	116	CCI 6.5" x 4.25" Plate	80.50 - 80.83	1.0000	1.0000
L10	117	CCI 6.5" x 4.25" Plate	80.50 - 80.83	1.0000	1.0000
L10	118	CCI 6.5" x 4.25" Plate	80.50 - 80.83	1.0000	1.0000
L10	166	CCI 4.5" x 1" Plate	78.33 - 80.83	1.0000	1.0000
L10	167	CCI 4.5" x 1" Plate	78.33 - 80.83	1.0000	1.0000
L10	168	CCI 4.5" x 1" Plate	78.33 - 80.83	1.0000	1.0000
L10	187	HCS 6X12 4AWG(1-5/8)	69.50 - 80.83	1.0000	1.0000
L10	189	AL7-50(1-5/8)	69.50 - 80.83	1.0000	1.0000
L10	213	Safety Line 3/8	69.50 - 80.83	1.0000	1.0000
L10	214	Climbing Rung	69.50 - 80.83	1.0000	1.0000
L11	15	CCI 6" x 1" Plate	61.17 - 69.50	1.0000	1.0000
L11	16	CCI 6" x 1" Plate	61.17 - 69.50	1.0000	1.0000
L11	17	CCI 6" x 1" Plate	61.17 - 69.50	1.0000	1.0000
L11	28	1" x 2" Plate	61.08 - 66.17	1.0000	1.0000
L11	29	1" x 2" Plate	61.08 - 66.17	1.0000	1.0000
L11	30	1" x 2" Plate	61.08 - 66.17	1.0000	1.0000
L11	31	1" x 2" Plate	61.08 - 66.17	1.0000	1.0000
L11	48	CCI 4.5" x 1" Plate	61.00 - 69.50	1.0000	1.0000
L11	49	CCI 4.5" x 1" Plate	61.00 - 69.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L11	50	CCI 4.5" x 1" Plate	61.00 - 69.50	1.0000	1.0000
L11	51	CCI 4.5" x 1" Plate	61.00 - 69.50	1.0000	1.0000
L11	87	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	88	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	89	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	90	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	91	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	92	CCI 8.5" x 1.25" Plate	60.58 - 61.08	1.0000	1.0000
L11	94	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	95	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	96	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	97	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	98	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	99	CCI 8.5" x 4.25" Plate	61.08 - 68.42	1.0000	1.0000
L11	101	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	102	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	103	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	104	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	105	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	106	CCI 8.5" x 1.25" Plate	68.42 - 69.50	1.0000	1.0000
L11	156	CCI 4.5" x 1" Plate	60.58 - 61.46	1.0000	1.0000
L11	157	CCI 4.5" x 1" Plate	60.58 - 61.46	1.0000	1.0000
L11	158	CCI 4.5" x 1" Plate	60.58 - 61.46	1.0000	1.0000
L11	159	CCI 4.5" x 1" Plate	60.58 - 61.46	1.0000	1.0000
L11	161	CCI 4.5" x 3" Plate	61.55 - 62.96	1.0000	1.0000
L11	162	CCI 4.5" x 3" Plate	61.55 - 62.96	1.0000	1.0000
L11	163	CCI 4.5" x 3" Plate	61.55 - 62.96	1.0000	1.0000
L11	164	CCI 4.5" x 3" Plate	61.55 - 62.96	1.0000	1.0000
L11	187	HCS 6X12 4AWG(1-5/8)	60.58 - 69.50	1.0000	1.0000
L11	189	AL7-50(1-5/8)	60.58 - 69.50	1.0000	1.0000
L11	213	Safety Line 3/8	60.58 - 69.50	1.0000	1.0000
L11	214	Climbing Rung	60.58 - 69.50	1.0000	1.0000
L12	11	CCI 6.5" x 1.25" Plate	52.17 - 59.92	1.0000	1.0000
L12	12	CCI 6.5" x 1.25" Plate	52.17 - 59.92	1.0000	1.0000
L12	13	CCI 6.5" x 1.25" Plate	52.17 - 59.92	1.0000	1.0000
L12	80	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	81	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	82	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	83	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	84	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	85	CCI 8.5" x 1.25" Plate	55.25 - 60.08	1.0000	1.0000
L12	87	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	88	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	89	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	90	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	91	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	92	CCI 8.5" x 1.25" Plate	60.08 - 60.58	1.0000	1.0000
L12	156	CCI 4.5" x 1" Plate	58.00 - 60.58	1.0000	1.0000
L12	157	CCI 4.5" x 1" Plate	58.00 - 60.58	1.0000	1.0000
L12	158	CCI 4.5" x 1" Plate	58.00 - 60.58	1.0000	1.0000
L12	159	CCI 4.5" x 1" Plate	58.00 - 60.58	1.0000	1.0000
L12	187	HCS 6X12 4AWG(1-5/8)	52.17 - 60.58	1.0000	1.0000
L12	189	AL7-50(1-5/8)	52.17 - 60.58	1.0000	1.0000
L12	213	Safety Line 3/8	52.17 - 60.58	1.0000	1.0000
L12	214	Climbing Rung	52.17 - 60.58	1.0000	1.0000
L13	11	CCI 6.5" x 1.25" Plate	40.83 - 52.17	1.0000	1.0000
L13	12	CCI 6.5" x 1.25" Plate	40.83 - 52.17	1.0000	1.0000
L13	13	CCI 6.5" x 1.25" Plate	40.83 - 52.17	1.0000	1.0000
L13	23	1" x 2" Plate	40.58 - 50.42	1.0000	1.0000
L13	24	1" x 2" Plate	40.58 - 50.42	1.0000	1.0000
L13	25	1" x 2" Plate	40.58 - 50.42	1.0000	1.0000
L13	26	1" x 2" Plate	40.58 - 50.42	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	43	CCI 6" x 1" Plate	40.33 - 50.17	1.0000	1.0000
L13	44	CCI 6" x 1" Plate	40.33 - 50.17	1.0000	1.0000
L13	45	CCI 6" x 1" Plate	40.33 - 50.17	1.0000	1.0000
L13	46	CCI 6" x 1" Plate	40.33 - 50.17	1.0000	1.0000
L13	73	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	74	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	75	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	76	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	77	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	78	CCI 6.5" x 1.25" Plate	40.33 - 47.83	1.0000	1.0000
L13	187	HCS 6X12 4AWG(1-5/8)	40.33 - 52.17	1.0000	1.0000
L13	189	AL7-50(1-5/8)	40.33 - 52.17	1.0000	1.0000
L13	213	Safety Line 3/8	40.33 - 52.17	1.0000	1.0000
L13	214	Climbing Rung	40.33 - 52.17	1.0000	1.0000
L14	7	CCI 6" x 1" Plate	28.00 - 39.75	1.0000	1.0000
L14	8	CCI 6" x 1" Plate	28.00 - 39.75	1.0000	1.0000
L14	9	CCI 6" x 1" Plate	28.00 - 39.75	1.0000	1.0000
L14	38	CCI 6" x 1" Plate	28.00 - 30.00	1.0000	1.0000
L14	39	CCI 6" x 1" Plate	28.00 - 30.00	1.0000	1.0000
L14	40	CCI 6" x 1" Plate	28.00 - 30.00	1.0000	1.0000
L14	41	CCI 6" x 1" Plate	28.00 - 30.00	1.0000	1.0000
L14	43	CCI 6" x 1" Plate	37.17 - 40.33	1.0000	1.0000
L14	44	CCI 6" x 1" Plate	37.17 - 40.33	1.0000	1.0000
L14	45	CCI 6" x 1" Plate	37.17 - 40.33	1.0000	1.0000
L14	46	CCI 6" x 1" Plate	37.17 - 40.33	1.0000	1.0000
L14	73	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	74	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	75	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	76	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	77	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	78	CCI 6.5" x 1.25" Plate	32.83 - 40.33	1.0000	1.0000
L14	187	HCS 6X12 4AWG(1-5/8)	28.00 - 40.33	1.0000	1.0000
L14	189	AL7-50(1-5/8)	28.00 - 40.33	1.0000	1.0000
L14	213	Safety Line 3/8	28.00 - 40.33	1.0000	1.0000
L14	214	Climbing Rung	28.00 - 40.33	1.0000	1.0000
L15	7	CCI 6" x 1" Plate	20.75 - 28.00	1.0000	1.0000
L15	8	CCI 6" x 1" Plate	20.75 - 28.00	1.0000	1.0000
L15	9	CCI 6" x 1" Plate	20.75 - 28.00	1.0000	1.0000
L15	38	CCI 6" x 1" Plate	20.08 - 28.00	1.0000	1.0000
L15	39	CCI 6" x 1" Plate	20.08 - 28.00	1.0000	1.0000
L15	40	CCI 6" x 1" Plate	20.08 - 28.00	1.0000	1.0000
L15	41	CCI 6" x 1" Plate	20.08 - 28.00	1.0000	1.0000
L15	66	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	67	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	68	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	69	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	70	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	71	CCI 6.5" x 1.25" Plate	20.08 - 27.50	1.0000	1.0000
L15	187	HCS 6X12 4AWG(1-5/8)	20.08 - 28.00	1.0000	1.0000
L15	189	AL7-50(1-5/8)	20.08 - 28.00	1.0000	1.0000
L15	213	Safety Line 3/8	20.08 - 28.00	1.0000	1.0000
L15	214	Climbing Rung	20.08 - 28.00	1.0000	1.0000
L16	33	CCI 6" x 1" Plate	17.00 - 19.00	1.0000	1.0000
L16	34	CCI 6" x 1" Plate	17.00 - 19.00	1.0000	1.0000
L16	35	CCI 6" x 1" Plate	17.00 - 19.00	1.0000	1.0000
L16	36	CCI 6" x 1" Plate	17.00 - 19.00	1.0000	1.0000
L16	38	CCI 6" x 1" Plate	17.00 - 20.08	1.0000	1.0000
L16	39	CCI 6" x 1" Plate	17.00 - 20.08	1.0000	1.0000
L16	40	CCI 6" x 1" Plate	17.00 - 20.08	1.0000	1.0000
L16	41	CCI 6" x 1" Plate	17.00 - 20.08	1.0000	1.0000
L16	66	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000
L16	67	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L16	68	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000
L16	69	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000
L16	70	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000
L16	71	CCI 6.5" x 1.25" Plate	17.00 - 20.08	1.0000	1.0000
L16	187	HCS 6X12 4AWG(1-5/8)	17.00 - 20.08	1.0000	1.0000
L16	189	AL7-50(1-5/8)	17.00 - 20.08	1.0000	1.0000
L16	213	Safety Line 3/8	17.00 - 20.08	1.0000	1.0000
L16	214	Climbing Rung	17.00 - 20.08	1.0000	1.0000
L17	5	CCI 4" x 0.75" Plate	11.67 - 13.17	1.0000	1.0000
L17	33	CCI 6" x 1" Plate	11.67 - 17.00	1.0000	1.0000
L17	34	CCI 6" x 1" Plate	11.67 - 17.00	1.0000	1.0000
L17	35	CCI 6" x 1" Plate	11.67 - 17.00	1.0000	1.0000
L17	36	CCI 6" x 1" Plate	11.67 - 17.00	1.0000	1.0000
L17	66	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	67	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	68	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	69	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	70	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	71	CCI 6.5" x 1.25" Plate	12.67 - 17.00	1.0000	1.0000
L17	187	HCS 6X12 4AWG(1-5/8)	11.67 - 17.00	1.0000	1.0000
L17	189	AL7-50(1-5/8)	11.67 - 17.00	1.0000	1.0000
L17	213	Safety Line 3/8	11.67 - 17.00	1.0000	1.0000
L17	214	Climbing Rung	11.67 - 17.00	1.0000	1.0000
L18	3	CCI 4" x 0.75" Plate	9.38 - 10.88	1.0000	1.0000
L18	4	CCI 4" x 0.75" Plate	9.38 - 10.88	1.0000	1.0000
L18	5	CCI 4" x 0.75" Plate	9.38 - 11.67	1.0000	1.0000
L18	33	CCI 6" x 1" Plate	9.38 - 11.67	1.0000	1.0000
L18	34	CCI 6" x 1" Plate	9.38 - 11.67	1.0000	1.0000
L18	35	CCI 6" x 1" Plate	9.38 - 11.67	1.0000	1.0000
L18	36	CCI 6" x 1" Plate	9.38 - 11.67	1.0000	1.0000
L18	187	HCS 6X12 4AWG(1-5/8)	9.38 - 11.67	1.0000	1.0000
L18	189	AL7-50(1-5/8)	9.38 - 11.67	1.0000	1.0000
L18	213	Safety Line 3/8	9.38 - 11.67	1.0000	1.0000
L18	214	Climbing Rung	9.38 - 11.67	1.0000	1.0000
L19	3	CCI 4" x 0.75" Plate	4.83 - 9.38	1.0000	1.0000
L19	4	CCI 4" x 0.75" Plate	4.83 - 9.38	1.0000	1.0000
L19	5	CCI 4" x 0.75" Plate	4.83 - 9.38	1.0000	1.0000
L19	33	CCI 6" x 1" Plate	4.83 - 9.38	1.0000	1.0000
L19	34	CCI 6" x 1" Plate	4.83 - 9.38	1.0000	1.0000
L19	35	CCI 6" x 1" Plate	4.83 - 9.38	1.0000	1.0000
L19	36	CCI 6" x 1" Plate	4.83 - 9.38	1.0000	1.0000
L19	187	HCS 6X12 4AWG(1-5/8)	4.83 - 9.38	1.0000	1.0000
L19	189	AL7-50(1-5/8)	4.83 - 9.38	1.0000	1.0000
L19	213	Safety Line 3/8	4.83 - 9.38	1.0000	1.0000
L19	214	Climbing Rung	4.83 - 9.38	1.0000	1.0000
L20	3	CCI 4" x 0.75" Plate	0.00 - 4.83	1.0000	1.0000
L20	4	CCI 4" x 0.75" Plate	0.00 - 4.83	1.0000	1.0000
L20	5	CCI 4" x 0.75" Plate	3.17 - 4.83	1.0000	1.0000
L20	33	CCI 6" x 1" Plate	0.00 - 4.83	1.0000	1.0000
L20	34	CCI 6" x 1" Plate	0.00 - 4.83	1.0000	1.0000
L20	35	CCI 6" x 1" Plate	0.00 - 4.83	1.0000	1.0000
L20	36	CCI 6" x 1" Plate	0.00 - 4.83	1.0000	1.0000
L20	187	HCS 6X12 4AWG(1-5/8)	0.00 - 4.83	1.0000	1.0000
L20	189	AL7-50(1-5/8)	0.00 - 4.83	1.0000	1.0000
L20	213	Safety Line 3/8	0.00 - 4.83	1.0000	1.0000
L20	214	Climbing Rung	0.00 - 4.83	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert (ft / ft / ft)	Azimuth Adjustment (°)	Placement (ft)		C_AA_A Front (ft^2)	C_AA_A Side (ft^2)	Weight (K)
Lightning Rod 5/8" x 4' on 4' Pole	B	From Leg	1.000 0.000 4.000	0.000	191.667	No Ice 1/2" Ice 1" Ice	1.393 2.131 2.702	1.393 2.131 2.702	0.066 0.087 0.112
(E) **d**									
OGB4-900D (E)	A	From Leg	1.000 0.000 4.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	0.785 1.028 1.281	0.785 1.028 1.281	0.010 0.016 0.025
6' x 2" Mount Pipe (E-Omni support) **d**	A	From Leg	0.500 0.000 0.000	0.000	192.000	No Ice 1/2" Ice 1" Ice	1.425 1.925 2.294	1.425 1.925 2.294	0.022 0.033 0.048
DB589-A (E)	B	From Leg	6.000 0.000 5.000	0.000	191.000	No Ice 1/2" Ice 1" Ice	2.763 4.170 5.593	2.763 4.170 5.593	0.012 0.033 0.063
WB2623 w/ Mount Pipe (E)	B	From Leg	6.000 0.000 -1.000	0.000	191.000	No Ice 1/2" Ice 1" Ice	1.929 2.158 2.399	0.866 1.110 1.369	0.020 0.038 0.058
3' x 2" Pipe Mount (E-For Omni)	B	From Leg	6.000 0.000 -1.000	0.000	191.000	No Ice 1/2" Ice 1" Ice	0.583 0.770 0.967	0.583 0.770 0.967	0.011 0.017 0.024
Side Arm Mount [SO 702-1] (E) **d**	B	From Leg	3.000 0.000 0.000	0.000	191.000	No Ice 1/2" Ice 1" Ice	1.000 1.250 1.500	1.430 2.050 2.670	0.027 0.038 0.049
LNX-6515DS-VTM w/ Mount Pipe (E)	A	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
LNX-6515DS-VTM w/ Mount Pipe (E)	B	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
LNX-6515DS-VTM w/ Mount Pipe (E)	C	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	11.683 12.404 13.135	9.842 11.366 12.914	0.083 0.173 0.273
(2) KRY 112 144/1 (E)	A	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
(2) KRY 112 144/1 (E)	B	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
(2) KRY 112 144/1 (E)	C	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.350 0.426 0.509	0.175 0.234 0.301	0.011 0.014 0.019
ATBT-BOTTOM-24V (E)	A	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.104 0.148 0.199	0.065 0.102 0.147	0.003 0.004 0.006
ATBT-BOTTOM-24V (E)	B	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.104 0.148 0.199	0.065 0.102 0.147	0.003 0.004 0.006
ATBT-BOTTOM-24V (E)	C	From Leg	4.000 0.000 -3.000	0.000	184.000	No Ice 1/2" Ice 1" Ice	0.104 0.148 0.199	0.065 0.102 0.147	0.003 0.004 0.006
AIR -32 B2A/B66AA w/	A	From Leg	4.000	0.000	184.000	No Ice	6.747	6.070	0.153

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000			1/2" Ice	7.202	6.867	0.214
(P)			-3.000			1" Ice	7.648	7.583	0.282
AIR -32 B2A/B66AA w/	B	From Leg	4.000	0.000	184.000	No Ice	6.747	6.070	0.153
Mount Pipe			0.000			1/2" Ice	7.202	6.867	0.214
(P)			-3.000			1" Ice	7.648	7.583	0.282
AIR -32 B2A/B66AA w/	C	From Leg	4.000	0.000	184.000	No Ice	6.747	6.070	0.153
Mount Pipe			0.000			1/2" Ice	7.202	6.867	0.214
(P)			-3.000			1" Ice	7.648	7.583	0.282
APX16DWV-16DWVS-E-A	A	From Leg	4.000	0.000	184.000	No Ice	7.233	3.782	0.064
20 w/ Mount Pipe			0.000			1/2" Ice	7.712	4.643	0.115
(P)			-3.000			1" Ice	8.176	5.382	0.173
APX16DWV-16DWVS-E-A	B	From Leg	4.000	0.000	184.000	No Ice	7.233	3.782	0.064
20 w/ Mount Pipe			0.000			1/2" Ice	7.712	4.643	0.115
(P)			-3.000			1" Ice	8.176	5.382	0.173
APX16DWV-16DWVS-E-A	C	From Leg	4.000	0.000	184.000	No Ice	7.233	3.782	0.064
20 w/ Mount Pipe			0.000			1/2" Ice	7.712	4.643	0.115
(P)			-3.000			1" Ice	8.176	5.382	0.173
Platform Mount [LP 405-1]	C	None		0.000	184.000	No Ice	20.800	20.800	1.800
(E)						1/2" Ice	28.100	28.100	2.066
						1" Ice	35.400	35.400	2.332
d									
(2) HBXX-6517DS-VTM w/	A	From Leg	4.000	0.000	160.000	No Ice	8.765	6.963	0.069
Mount Pipe			0.000			1/2" Ice	9.342	8.182	0.139
(E)			0.000			1" Ice	9.889	9.144	0.217
(2) HBXX-6517DS-VTM w/	B	From Leg	4.000	0.000	160.000	No Ice	8.765	6.963	0.069
Mount Pipe			0.000			1/2" Ice	9.342	8.182	0.139
(E)			0.000			1" Ice	9.889	9.144	0.217
(2) HBXX-6517DS-VTM w/	C	From Leg	4.000	0.000	160.000	No Ice	8.765	6.963	0.069
Mount Pipe			0.000			1/2" Ice	9.342	8.182	0.139
(E)			0.000			1" Ice	9.889	9.144	0.217
LNX-6514DS-A1M w/	A	From Leg	4.000	0.000	160.000	No Ice	8.411	7.082	0.065
Mount Pipe			0.000			1/2" Ice	8.975	8.273	0.134
(E)			0.000			1" Ice	9.505	9.185	0.211
LNX-6514DS-A1M w/	B	From Leg	4.000	0.000	160.000	No Ice	8.411	7.082	0.065
Mount Pipe			0.000			1/2" Ice	8.975	8.273	0.134
(E)			0.000			1" Ice	9.505	9.185	0.211
(2) LNX-6514DS-A1M w/	C	From Leg	4.000	0.000	160.000	No Ice	8.411	7.082	0.065
Mount Pipe			0.000			1/2" Ice	8.975	8.273	0.134
(E)			0.000			1" Ice	9.505	9.185	0.211
LNX-8513DS-VTM w/	A	From Leg	4.000	0.000	160.000	No Ice	8.411	7.082	0.065
Mount Pipe			0.000			1/2" Ice	8.975	8.273	0.134
(E)			0.000			1" Ice	9.505	9.185	0.211
LNX-8513DS-VTM w/	B	From Leg	4.000	0.000	160.000	No Ice	8.411	7.082	0.065
Mount Pipe			0.000			1/2" Ice	8.975	8.273	0.134
(E)			0.000			1" Ice	9.505	9.185	0.211
RRH2x40 700	A	From Leg	4.000	0.000	160.000	No Ice	1.962	1.034	0.050
(E)			0.000			1/2" Ice	2.137	1.168	0.067
			0.000			1" Ice	2.318	1.311	0.086
RRH2x40 700	B	From Leg	4.000	0.000	160.000	No Ice	1.962	1.034	0.050
(E)			0.000			1/2" Ice	2.137	1.168	0.067
			0.000			1" Ice	2.318	1.311	0.086
RRH2x40 700	C	From Leg	4.000	0.000	160.000	No Ice	1.962	1.034	0.050
(E)			0.000			1/2" Ice	2.137	1.168	0.067
			0.000			1" Ice	2.318	1.311	0.086
RRH2X60-AWS	A	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(E)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2X60-AWS	B	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(E)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109
RRH2X60-AWS	C	From Leg	4.000	0.000	160.000	No Ice	3.500	1.816	0.060
(E)			0.000			1/2" Ice	3.761	2.052	0.083
			0.000			1" Ice	4.029	2.289	0.109
RRH2X60-PCS	A	From Leg	4.000	0.000	160.000	No Ice	2.200	1.723	0.055
(E)			0.000			1/2" Ice	2.393	1.901	0.075
			0.000			1" Ice	2.593	2.087	0.099
RRH2X60-PCS	B	From Leg	4.000	0.000	160.000	No Ice	2.200	1.723	0.055
(E)			0.000			1/2" Ice	2.393	1.901	0.075
			0.000			1" Ice	2.593	2.087	0.099
RRH2X60-PCS	C	From Leg	4.000	0.000	160.000	No Ice	2.200	1.723	0.055
(E)			0.000			1/2" Ice	2.393	1.901	0.075
			0.000			1" Ice	2.593	2.087	0.099
(2) FD9R6004/2C-3L	A	From Leg	4.000	0.000	160.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			0.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	B	From Leg	4.000	0.000	160.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			0.000			1" Ice	0.466	0.169	0.009
(2) FD9R6004/2C-3L	C	From Leg	4.000	0.000	160.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			0.000			1" Ice	0.466	0.169	0.009
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	160.000	No Ice	4.800	2.000	0.044
(E)			0.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
Platform Mount [LP 303-1]	C	None		0.000	160.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
d									
SRL-224NM-4	B	From Leg	6.000	0.000	158.000	No Ice	2.600	2.600	0.035
(E)			0.000			1/2" Ice	4.680	4.680	0.045
			0.000			1" Ice	6.760	6.760	0.056
DB205-A	C	From Leg	6.000	0.000	158.000	No Ice	1.200	1.200	0.038
(E)			0.000			1/2" Ice	2.160	2.160	0.049
			0.000			1" Ice	3.120	3.120	0.061
4' x 2" Pipe Mount	B	From Leg	6.000	0.000	158.000	No Ice	0.785	0.785	0.029
(E-For Omni)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	C	From Leg	6.000	0.000	158.000	No Ice	0.785	0.785	0.029
(E-For Omni)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Side Arm Mount [SO 702-1]	B	From Leg	3.000	0.000	158.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
Side Arm Mount [SO 702-1]	C	From Leg	3.000	0.000	158.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
d									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	151.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			0.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	151.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			0.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	151.000	No Ice	5.746	4.254	0.055

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)			0.000				1/2" Ice	6.179	5.014	0.103
			0.000				1" Ice	6.607	5.711	0.157
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	151.000	No Ice	11.683	9.842	0.099
			0.000				1/2" Ice	12.404	11.366	0.189
(E)			0.000				1" Ice	13.135	12.914	0.288
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	151.000	No Ice	11.683	9.842	0.099
			0.000				1/2" Ice	12.404	11.366	0.189
(E)			0.000				1" Ice	13.135	12.914	0.288
(2) SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	151.000	No Ice	11.683	9.842	0.099
			0.000				1/2" Ice	12.404	11.366	0.189
(E)			0.000				1" Ice	13.135	12.914	0.288
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	151.000	No Ice	8.262	6.304	0.074
			0.000				1/2" Ice	8.822	7.479	0.139
(E)			0.000				1" Ice	9.346	8.368	0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	151.000	No Ice	8.262	6.304	0.074
			0.000				1/2" Ice	8.822	7.479	0.139
(E)			0.000				1" Ice	9.346	8.368	0.212
(2) DTMABP7819VG12A	A	From Leg	4.000	0.000	0.000	151.000	No Ice	0.976	0.339	0.019
(E)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
(2) DTMABP7819VG12A	B	From Leg	4.000	0.000	0.000	151.000	No Ice	0.976	0.339	0.019
(E)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
(2) DTMABP7819VG12A	C	From Leg	4.000	0.000	0.000	151.000	No Ice	0.976	0.339	0.019
(E)			0.000				1/2" Ice	1.100	0.419	0.026
			0.000				1" Ice	1.232	0.510	0.036
(2) LGP21901	A	From Leg	4.000	0.000	0.000	151.000	No Ice	0.231	0.158	0.006
(E)			0.000				1/2" Ice	0.294	0.213	0.008
			0.000				1" Ice	0.365	0.276	0.011
(2) LGP21901	B	From Leg	4.000	0.000	0.000	151.000	No Ice	0.231	0.158	0.006
(E)			0.000				1/2" Ice	0.294	0.213	0.008
			0.000				1" Ice	0.365	0.276	0.011
(2) LGP21901	C	From Leg	4.000	0.000	0.000	151.000	No Ice	0.231	0.158	0.006
(E)			0.000				1/2" Ice	0.294	0.213	0.008
			0.000				1" Ice	0.365	0.276	0.011
(2) CM1007-DBPXBC-003	A	From Leg	4.000	0.000	0.000	151.000	No Ice	0.367	0.134	0.007
(E)			0.000				1/2" Ice	0.448	0.183	0.010
			0.000				1" Ice	0.536	0.240	0.015
(2) CM1007-DBPXBC-003	B	From Leg	4.000	0.000	0.000	151.000	No Ice	0.367	0.134	0.007
(E)			0.000				1/2" Ice	0.448	0.183	0.010
			0.000				1" Ice	0.536	0.240	0.015
(2) CM1007-DBPXBC-003	C	From Leg	4.000	0.000	0.000	151.000	No Ice	0.367	0.134	0.007
(E)			0.000				1/2" Ice	0.448	0.183	0.010
			0.000				1" Ice	0.536	0.240	0.015
Platform Mount [LP 403-1]	C	None			0.000	151.000	No Ice	18.850	18.850	1.500
(E)							1/2" Ice	24.300	24.300	1.797
							1" Ice	29.750	29.750	2.093
d										
TME-RRUS 11 B2	A	From Leg	1.000	0.000	0.000	148.000	No Ice	2.833	1.182	0.051
(E)			0.000				1/2" Ice	3.043	1.330	0.072
			0.000				1" Ice	3.259	1.485	0.095
TME-RRUS 11 B2	B	From Leg	1.000	0.000	0.000	148.000	No Ice	2.833	1.182	0.051
(E)			0.000				1/2" Ice	3.043	1.330	0.072
			0.000				1" Ice	3.259	1.485	0.095
TME-RRUS 11 B2	C	From Leg	1.000	0.000	0.000	148.000	No Ice	2.833	1.182	0.051
(E)			0.000				1/2" Ice	3.043	1.330	0.072
			0.000				1" Ice	3.259	1.485	0.095

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
DC6-48-60-18-8F	C	From Leg	1.000	0.000	148.000	No Ice	0.917	0.917	0.019
(E)			0.000			1/2" Ice	1.458	1.458	0.037
			0.000			1" Ice	1.643	1.643	0.057
TME-RRUS 12 B2	A	From Leg	1.000	0.000	148.000	No Ice	3.145	1.285	0.049
(R)			0.000			1/2" Ice	3.365	1.438	0.073
			0.000			1" Ice	3.592	1.600	0.099
TME-RRUS 12 B2	B	From Leg	1.000	0.000	148.000	No Ice	3.145	1.285	0.049
(R)			0.000			1/2" Ice	3.365	1.438	0.073
			0.000			1" Ice	3.592	1.600	0.099
TME-RRUS 12 B2	C	From Leg	1.000	0.000	148.000	No Ice	3.145	1.285	0.049
(R)			0.000			1/2" Ice	3.365	1.438	0.073
			0.000			1" Ice	3.592	1.600	0.099
Side Arm Mount [SO 102-3]	C	None		0.000	148.000	No Ice	3.000	3.000	0.081
(E)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
Pipe Mount [PM 601-3]	C	None		0.000	148.000	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
d									
SRL-235-2	B	From Leg	6.000	0.000	132.000	No Ice	7.000	7.000	0.076
(E)			0.000			1/2" Ice	9.037	9.037	0.125
			0.000			1" Ice	11.092	11.092	0.187
4' x 2" Pipe Mount	B	From Leg	6.000	0.000	132.000	No Ice	0.785	0.785	0.029
(E-For Omni)			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
Side Arm Mount [SO 702-1]	B	From Leg	3.000	0.000	132.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
Side Arm Mount [SO 104-3]	C	None		0.000	132.000	No Ice	3.300	3.300	0.287
(E-Mount Attachment)						1/2" Ice	4.130	4.130	0.317
						1" Ice	4.960	4.960	0.347
d									
PCS 1900 TMA RX	A	From Leg	2.000	0.000	124.000	No Ice	0.539	0.529	0.018
(E)			0.000			1/2" Ice	0.638	0.628	0.023
			0.000			1" Ice	0.745	0.734	0.031
2' x 2" Pipe Mount	A	From Leg	2.000	0.000	124.000	No Ice	0.023	0.023	0.007
(E-For TMA)			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 104-3]	C	None		0.000	124.000	No Ice	3.300	3.300	0.287
(E)						1/2" Ice	4.130	4.130	0.317
						1" Ice	4.960	4.960	0.347
d									
* Sprint*									
(3) 844G65VTZAS w/ Mount Pipe	A	From Leg	4.000	0.000	116.000	No Ice	5.486	4.984	0.034
(AB)			0.000			1/2" Ice	5.876	5.600	0.086
			2.000			1" Ice	6.273	6.227	0.144
(3) 844G65VTZAS w/ Mount Pipe	B	From Leg	4.000	0.000	116.000	No Ice	5.486	4.984	0.034
(AB)			0.000			1/2" Ice	5.876	5.600	0.086
			2.000			1" Ice	6.273	6.227	0.144
(3) 844G65VTZAS w/ Mount Pipe	C	From Leg	4.000	0.000	116.000	No Ice	5.486	4.984	0.034
(AB)			0.000			1/2" Ice	5.876	5.600	0.086
*			2.000			1" Ice	6.273	6.227	0.144
* Clear Wire*									
LLPX310R w/ Mount Pipe	A	From Leg	4.000	0.000	116.000	No Ice	4.538	2.985	0.045
(E)			0.000			1/2" Ice	4.892	3.528	0.083
			2.000			1" Ice	5.254	4.087	0.126

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R w/ Mount Pipe	B	From Leg	4.000	0.000	116.000	No Ice	4.538	2.985	0.045
(E)			0.000			1/2" Ice	4.892	3.528	0.083
			2.000			1" Ice	5.254	4.087	0.126
LLPX310R w/ Mount Pipe	C	From Leg	4.000	0.000	116.000	No Ice	4.538	2.985	0.045
(E)			0.000			1/2" Ice	4.892	3.528	0.083
			2.000			1" Ice	5.254	4.087	0.126
WIMAX DAP HEAD	A	From Leg	4.000	0.000	116.000	No Ice	1.547	0.684	0.033
(E)			0.000			1/2" Ice	1.704	0.800	0.045
			2.000			1" Ice	1.868	0.923	0.058
WIMAX DAP HEAD	B	From Leg	4.000	0.000	116.000	No Ice	1.547	0.684	0.033
(E)			0.000			1/2" Ice	1.704	0.800	0.045
			2.000			1" Ice	1.868	0.923	0.058
WIMAX DAP HEAD	C	From Leg	4.000	0.000	116.000	No Ice	1.547	0.684	0.033
(E)			0.000			1/2" Ice	1.704	0.800	0.045
			2.000			1" Ice	1.868	0.923	0.058
HORIZON DUO	A	From Leg	4.000	0.000	116.000	No Ice	0.469	0.294	0.007
(E)			0.000			1/2" Ice	0.556	0.365	0.012
			4.000			1" Ice	0.650	0.444	0.018
Platform Mount [LP 405-1]	C	None		0.000	116.000	No Ice	20.800	20.800	1.800
(E)						1/2" Ice	28.100	28.100	2.066
						1" Ice	35.400	35.400	2.332
d									
DB205-A	B	From Leg	6.000	0.000	90.000	No Ice	1.200	1.200	0.038
(E-Per Photo)			0.000			1/2" Ice	2.160	2.160	0.049
			9.000			1" Ice	3.120	3.120	0.061
MT-485002 w/ Mount Pipe	C	From Leg	6.000	0.000	90.000	No Ice	1.372	0.473	0.011
(E)			0.000			1/2" Ice	1.574	0.681	0.022
			0.000			1" Ice	1.788	0.902	0.037
5' x 2" Pipe Mount	B	From Leg	6.000	0.000	90.000	No Ice	1.000	1.000	0.029
(E-For Omni)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
Side Arm Mount [SO 702-1]	B	From Leg	3.000	0.000	90.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
Side Arm Mount [SO 702-1]	C	From Leg	3.000	0.000	90.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
d									
SRL-235-2	C	From Leg	3.000	0.000	70.000	No Ice	7.000	7.000	0.076
(E)			0.000			1/2" Ice	9.037	9.037	0.125
			0.000			1" Ice	11.092	11.092	0.187
2" x 2' Omni	C	From Leg	3.000	0.000	70.000	No Ice	0.304	0.304	0.005
(E-Per Photo)			0.000			1/2" Ice	0.432	0.432	0.008
			-6.000			1" Ice	0.578	0.578	0.013
6' x 2" Mount Pipe	C	From Leg	3.000	0.000	70.000	No Ice	1.425	1.425	0.022
(E-For Omni)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	70.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
Side Arm Mount [SO 102-3]	C	None		0.000	70.000	No Ice	3.000	3.000	0.081
(E-Mount Attachment)						1/2" Ice	3.480	3.480	0.111
						1" Ice	3.960	3.960	0.141
d									
DB909XVTE-M	B	From Leg	3.000	0.000	33.000	No Ice	1.943	1.943	0.024
(E)			0.000			1/2" Ice	2.622	2.622	0.047
			0.000			1" Ice	2.952	2.952	0.073

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
2" x 4' Omni	B	From Leg	3.000	0.000	33.000	No Ice	0.304	0.304	0.005
(E-Per Photo)			0.000			1/2" Ice	0.432	0.432	0.008
			0.000			1" Ice	0.578	0.578	0.013
6' x 2" Mount Pipe	B	From Leg	3.000	0.000	33.000	No Ice	1.425	1.425	0.022
(E-For Yagi)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
Side Arm Mount [SO 702-1]	B	From Leg	1.500	0.000	33.000	No Ice	1.000	1.430	0.027
(E)			0.000			1/2" Ice	1.250	2.050	0.038
			0.000			1" Ice	1.500	2.670	0.049
d									
4' ICE SHIELDS	A	From Leg	0.500	0.000	178.000	No Ice	1.400	0.467	0.030
(E)			0.000			1/2" Ice	1.884	0.640	0.095
			0.000			1" Ice	2.377	0.821	0.167
4' ICE SHIELDS	A	From Leg	0.500	0.000	138.000	No Ice	1.400	0.467	0.030
(E)			0.000			1/2" Ice	1.884	0.640	0.095
			0.000			1" Ice	2.377	0.821	0.167
4' ICE SHIELDS	A	From Leg	0.500	0.000	98.000	No Ice	1.400	0.467	0.030
(E)			0.000			1/2" Ice	1.884	0.640	0.095
			0.000			1" Ice	2.377	0.821	0.167
4' ICE SHIELDS	B	From Leg	0.500	0.000	98.000	No Ice	1.400	0.467	0.030
(E)			0.000			1/2" Ice	1.884	0.640	0.095
			0.000			1" Ice	2.377	0.821	0.167
4' ICE SHIELDS	C	From Leg	0.500	0.000	98.000	No Ice	1.400	0.467	0.030
(E)			0.000			1/2" Ice	1.884	0.640	0.095
			0.000			1" Ice	2.377	0.821	0.167
d									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Andrew VHLP2-18	A	Paraboloid	From	4.000	90.000		116.000	2.175	No Ice	3.715	0.031
(E)		w/Shroud (HP)	Leg	0.000					1/2" Ice	4.006	0.052
				4.000					1" Ice	4.296	0.072
d											
KP2F-34	B	Grid	From	6.000	5.000		90.000	2.000	No Ice	3.140	0.005
(E)			Leg	0.000					1/2" Ice	3.410	0.023
				0.000					1" Ice	3.680	0.040
d											

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	191.667 - 181.583	Pole	Max Tension	36	0.000	-0.000	0.000
			Max. Compression	26	-11.285	-3.077	-1.740
			Max. Mx	8	-4.246	-10.035	-0.395

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-4.233	-0.528	-9.773
			Max. Vy	8	4.802	-10.035	-0.395
			Max. Vx	14	4.799	-0.528	-9.773
			Max. Torque	5			-1.660
L2	181.583 - 141.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45.077	-3.498	-3.017
			Max. Mx	8	-16.812	-395.824	-1.860
			Max. My	14	-16.749	-1.096	-404.926
			Max. Vy	8	17.270	-395.824	-1.860
			Max. Vx	14	17.668	-1.096	-404.926
			Max. Torque	5			-2.348
L3	141.417 - 121.167	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.826	-9.639	-4.380
			Max. Mx	8	-23.153	-770.153	-2.713
			Max. My	14	-23.076	-2.562	-791.038
			Max. Vy	8	19.638	-770.153	-2.713
			Max. Vx	14	20.440	-2.562	-791.038
			Max. Torque	5			-4.757
L4	121.167 - 110.042	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-70.280	-10.904	-3.634
			Max. Mx	8	-29.039	-1017.998	-2.758
			Max. My	14	-28.955	-3.004	-1047.812
			Max. Vy	20	-23.837	1014.613	-0.805
			Max. Vx	14	24.693	-3.004	-1047.812
			Max. Torque	5			-4.715
L5	110.042 - 105.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-73.548	-11.077	-4.082
			Max. Mx	8	-30.874	-1137.107	-2.889
			Max. My	14	-30.770	-3.192	-1172.963
			Max. Vy	20	-24.265	1133.801	-0.861
			Max. Vx	14	25.761	-3.192	-1172.963
			Max. Torque	5			-4.083
L6	105.083 - 100.917	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-77.746	-11.252	-4.509
			Max. Mx	8	-33.494	-1238.922	-3.076
			Max. My	14	-33.374	-3.333	-1282.452
			Max. Vy	20	-24.687	1235.717	-0.986
			Max. Vx	14	26.745	-3.333	-1282.452
			Max. Torque	5			-4.083
L7	100.917 - 95.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-82.196	-11.898	-4.623
			Max. Mx	8	-35.443	-1365.661	-3.228
			Max. My	14	-35.327	-3.531	-1420.007
			Max. Vy	20	-25.247	1362.528	-1.062
			Max. Vx	14	27.353	-3.531	-1420.007
			Max. Torque	5			-4.082
L8	95.833 - 89.917	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-86.589	-13.917	-6.572
			Max. Mx	8	-37.823	-1517.397	-3.913
			Max. My	14	-37.711	-4.249	-1584.594
			Max. Vy	20	-26.068	1513.322	-1.659
			Max. Vx	14	28.196	-4.249	-1584.594
			Max. Torque	5			-5.094
L9	89.917 -	Pole	Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	80.833						
			Max. Compression	26	-96.423	-14.215	-6.045
			Max. Mx	8	-44.125	-1757.246	-3.589
			Max. My	14	-44.019	-3.915	-1844.863
			Max. Vy	20	-26.941	1754.605	-1.339
			Max. Vx	14	29.192	-3.915	-1844.863
			Max. Torque	5			-5.093
L10	80.833 - 69.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-107.785	-13.073	-7.437
			Max. Mx	8	-50.682	-2067.907	-3.982
			Max. My	14	-50.586	-3.657	-2182.776
			Max. Vy	20	-28.498	2066.821	-1.725
			Max. Vx	14	30.830	-3.657	-2182.776
			Max. Torque	5			-5.093
L11	69.5 - 60.583	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-124.340	-15.483	-6.625
			Max. Mx	8	-62.409	-2328.155	-3.308
			Max. My	14	-62.296	-5.584	-2467.600
			Max. Vy	20	-29.594	2324.188	-0.828
			Max. Vx	14	33.243	-5.584	-2467.600
			Max. Torque	7			-4.697
L12	60.583 - 52.167	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-133.098	-16.799	-6.569
			Max. Mx	8	-67.875	-2580.421	-3.426
			Max. My	14	-67.774	-6.151	-2750.775
			Max. Vy	20	-30.382	2576.240	-0.736
			Max. Vx	14	34.070	-6.151	-2750.775
			Max. Torque	7			-4.696
L13	52.167 - 40.333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-146.847	-19.933	-5.935
			Max. Mx	8	-76.315	-2946.321	-3.549
			Max. My	14	-76.231	-7.370	-3160.648
			Max. Vy	20	-31.406	2940.993	-0.565
			Max. Vx	14	35.219	-7.370	-3160.648
			Max. Torque	7			-4.696
L14	40.333 - 28	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-159.704	-23.566	-5.976
			Max. Mx	8	-84.476	-3340.056	-3.734
			Max. My	14	-84.416	-8.712	-3600.931
			Max. Vy	20	-32.403	3333.308	-0.499
			Max. Vx	14	36.212	-8.712	-3600.931
			Max. Torque	7			-5.347
L15	28 - 20.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-169.463	-23.936	-5.988
			Max. Mx	8	-90.949	-3598.302	-4.183
			Max. My	14	-90.904	-9.001	-3890.054
			Max. Vy	20	-32.919	3591.738	-0.840
			Max. Vx	14	36.755	-9.001	-3890.054
			Max. Torque	7			-5.347
L16	20.083 - 17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-173.036	-24.146	-5.964
			Max. Mx	8	-93.277	-3699.918	-4.363
			Max. My	14	-93.239	-9.110	-4003.755
			Max. Vy	20	-33.095	3693.429	-0.979
			Max. Vx	14	36.940	-9.110	-4003.755
			Max. Torque	7			-5.346
L17	17 - 11.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-179.188	-24.857	-6.115
			Max. Mx	8	-97.624	-3876.997	-4.643

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-97.597	-9.306	-4201.735
			Max. Vy	20	-33.404	3870.625	-1.187
			Max. Vx	14	37.252	-9.306	-4201.735
			Max. Torque	7			-5.346
L18	11.667 - 9.375	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-181.341	-25.164	-6.030
			Max. Mx	8	-99.149	-3953.613	-4.708
			Max. My	14	-99.127	-9.404	-4287.260
			Max. Vy	20	-33.533	3947.262	-1.221
			Max. Vx	14	37.375	-9.404	-4287.260
			Max. Torque	7			-5.346
L19	9.375 - 4.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-185.751	-25.791	-5.775
			Max. Mx	8	-102.338	-4106.315	-4.835
			Max. My	14	-102.326	-9.597	-4457.581
			Max. Vy	20	-33.788	4100.006	-1.288
			Max. Vx	14	37.619	-9.597	-4457.581
			Max. Torque	7			-5.346
L20	4.833 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-190.199	-26.475	-5.502
			Max. Mx	8	-105.676	-4270.017	-4.969
			Max. My	14	-105.675	-9.800	-4639.972
			Max. Vy	20	-34.040	4263.756	-1.359
			Max. Vx	14	37.857	-9.800	-4639.972
			Max. Torque	7			-5.346

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	190.199	-0.000	-0.000
	Max. H_x	20	105.683	34.019	0.005
	Max. H_z	2	105.683	-0.008	37.834
	Max. M_x	2	4633.921	-0.008	37.834
	Max. M_z	8	4270.017	-33.979	-0.008
	Max. Torsion	19	5.082	29.277	-16.939
	Min. Vert	7	79.262	-29.242	16.927
	Min. H_x	8	105.683	-33.979	-0.008
	Min. H_z	14	105.683	-0.027	-37.834
	Min. M_x	14	-4639.972	-0.027	-37.834
	Min. M_z	20	-4263.756	34.019	0.005
	Min. Torsion	7	-5.346	-29.242	16.927

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	88.069	0.000	0.000	2.419	-4.470	-0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	105.683	0.008	-37.834	-4633.921	-5.649	3.604
0.9 Dead+1.6 Wind 0 deg - No	79.262	0.008	-37.834	-4592.982	-4.230	3.602

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Ice						
1.2 Dead+1.6 Wind 30 deg - No Ice	105.683	17.089	-29.667	-3719.411	-2145.860	4.910
0.9 Dead+1.6 Wind 30 deg - No Ice	79.262	17.089	-29.667	-3686.057	-2124.832	4.911
1.2 Dead+1.6 Wind 60 deg - No Ice	105.683	29.242	-16.927	-2129.600	-3684.910	5.344
0.9 Dead+1.6 Wind 60 deg - No Ice	79.262	29.242	-16.927	-2110.772	-3649.677	5.346
1.2 Dead+1.6 Wind 90 deg - No Ice	105.683	33.979	0.008	4.969	-4270.017	4.256
0.9 Dead+1.6 Wind 90 deg - No Ice	79.262	33.979	0.008	4.160	-4229.466	4.260
1.2 Dead+1.6 Wind 120 deg - No Ice	105.683	30.803	17.840	2204.657	-3800.093	1.735
0.9 Dead+1.6 Wind 120 deg - No Ice	79.262	30.803	17.840	2183.872	-3764.238	1.739
1.2 Dead+1.6 Wind 150 deg - No Ice	105.683	19.295	33.481	4063.729	-2342.811	-1.469
0.9 Dead+1.6 Wind 150 deg - No Ice	79.262	19.295	33.481	4026.596	-2320.483	-1.466
1.2 Dead+1.6 Wind 180 deg - No Ice	105.683	0.027	37.834	4639.972	-9.800	-3.793
0.9 Dead+1.6 Wind 180 deg - No Ice	79.262	0.027	37.834	4597.459	-8.330	-3.791
1.2 Dead+1.6 Wind 210 deg - No Ice	105.683	-17.118	29.663	3724.772	2138.550	-4.682
0.9 Dead+1.6 Wind 210 deg - No Ice	79.262	-17.118	29.663	3689.854	2120.347	-4.683
1.2 Dead+1.6 Wind 240 deg - No Ice	105.683	-29.277	16.939	2137.002	3678.275	-5.079
0.9 Dead+1.6 Wind 240 deg - No Ice	79.262	-29.277	16.939	2116.597	3645.864	-5.082
1.2 Dead+1.6 Wind 270 deg - No Ice	105.683	-34.019	-0.005	1.358	4263.756	-4.063
0.9 Dead+1.6 Wind 270 deg - No Ice	79.262	-34.019	-0.005	0.597	4226.028	-4.067
1.2 Dead+1.6 Wind 300 deg - No Ice	105.683	-30.837	-17.844	-2199.282	3793.372	-1.560
0.9 Dead+1.6 Wind 300 deg - No Ice	79.262	-30.837	-17.844	-2180.064	3760.345	-1.563
1.2 Dead+1.6 Wind 330 deg - No Ice	105.683	-19.327	-33.471	-4056.377	2335.823	1.663
0.9 Dead+1.6 Wind 330 deg - No Ice	79.262	-19.327	-33.471	-4020.830	2316.321	1.660
1.2 Dead+1.0 Ice+1.0 Temp	190.199	0.000	0.000	5.502	-26.475	-0.001
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	190.199	-0.024	-13.185	-1640.133	-25.248	1.886
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	190.199	5.823	-10.166	-1290.675	-768.497	2.716
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	190.199	9.917	-5.765	-734.599	-1297.050	2.903
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	190.199	12.158	-0.007	4.405	-1573.113	2.312
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	190.199	10.643	6.183	777.130	-1352.635	0.997
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	190.199	6.581	11.473	1433.114	-843.959	-0.651
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	190.199	-0.001	13.173	1650.132	-26.345	-1.987
1.2 Dead+1.0 Wind 210	190.199	-5.836	10.161	1301.282	716.237	-2.659

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 240	190.199	-9.949	5.748	744.230	1246.677	-2.793
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 270	190.199	-12.180	-0.018	4.433	1521.840	-2.139
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 300	190.199	-10.663	-6.196	-767.264	1301.126	-0.921
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	190.199	-6.612	-11.473	-1421.894	793.515	0.609
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	88.069	0.002	-8.095	-984.061	-4.626	0.739
Dead+Wind 30 deg - Service	88.069	3.656	-6.347	-789.375	-459.919	1.054
Dead+Wind 60 deg - Service	88.069	6.257	-3.622	-451.161	-787.307	1.147
Dead+Wind 90 deg - Service	88.069	7.270	0.002	2.919	-911.783	0.914
Dead+Wind 120 deg - Service	88.069	6.591	3.817	470.889	-811.873	0.393
Dead+Wind 150 deg - Service	88.069	4.128	7.164	866.493	-501.900	-0.253
Dead+Wind 180 deg - Service	88.069	0.006	8.095	989.069	-5.507	-0.779
Dead+Wind 210 deg - Service	88.069	-3.663	6.347	794.239	451.519	-1.005
Dead+Wind 240 deg - Service	88.069	-6.264	3.624	456.462	779.053	-1.090
Dead+Wind 270 deg - Service	88.069	-7.279	-0.001	2.152	903.611	-0.872
Dead+Wind 300 deg - Service	88.069	-6.598	-3.818	-466.024	803.604	-0.355
Dead+Wind 330 deg - Service	88.069	-4.135	-7.161	-861.209	493.571	0.294

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-88.069	0.000	0.000	88.069	0.000	0.000%
2	0.008	-105.683	-37.834	-0.008	105.683	37.834	0.000%
3	0.008	-79.262	-37.834	-0.008	79.262	37.834	0.000%
4	17.089	-105.683	-29.667	-17.089	105.683	29.667	0.000%
5	17.089	-79.262	-29.667	-17.089	79.262	29.667	0.000%
6	29.242	-105.683	-16.927	-29.242	105.683	16.927	0.000%
7	29.242	-79.262	-16.927	-29.242	79.262	16.927	0.000%
8	33.979	-105.683	0.008	-33.979	105.683	-0.008	0.000%
9	33.979	-79.262	0.008	-33.979	79.262	-0.008	0.000%
10	30.803	-105.683	17.840	-30.803	105.683	-17.840	0.000%
11	30.803	-79.262	17.840	-30.803	79.262	-17.840	0.000%
12	19.295	-105.683	33.481	-19.295	105.683	-33.481	0.000%
13	19.295	-79.262	33.481	-19.295	79.262	-33.481	0.000%
14	0.027	-105.683	37.834	-0.027	105.683	-37.834	0.000%
15	0.027	-79.262	37.834	-0.027	79.262	-37.834	0.000%
16	-17.118	-105.683	29.663	17.118	105.683	-29.663	0.000%
17	-17.118	-79.262	29.663	17.118	79.262	-29.663	0.000%
18	-29.277	-105.683	16.939	29.277	105.683	-16.939	0.000%
19	-29.277	-79.262	16.939	29.277	79.262	-16.939	0.000%
20	-34.019	-105.683	-0.005	34.019	105.683	0.005	0.000%
21	-34.019	-79.262	-0.005	34.019	79.262	0.005	0.000%
22	-30.837	-105.683	-17.844	30.837	105.683	17.844	0.000%
23	-30.837	-79.262	-17.844	30.837	79.262	17.844	0.000%
24	-19.327	-105.683	-33.471	19.327	105.683	33.471	0.000%
25	-19.327	-79.262	-33.471	19.327	79.262	33.471	0.000%
26	0.000	-190.199	0.000	-0.000	190.199	-0.000	0.000%
27	-0.024	-190.199	-13.185	0.024	190.199	13.185	0.000%
28	5.823	-190.199	-10.166	-5.823	190.199	10.166	0.000%
29	9.917	-190.199	-5.765	-9.917	190.199	5.765	0.000%
30	12.158	-190.199	-0.007	-12.158	190.199	0.007	0.000%
31	10.643	-190.199	6.183	-10.643	190.199	-6.183	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
32	6.581	-190.199	11.473	-6.581	190.199	-11.473	0.000%
33	-0.001	-190.199	13.173	0.001	190.199	-13.173	0.000%
34	-5.836	-190.199	10.161	5.836	190.199	-10.161	0.000%
35	-9.949	-190.199	5.748	9.949	190.199	-5.748	0.000%
36	-12.180	-190.199	-0.018	12.180	190.199	0.018	0.000%
37	-10.663	-190.199	-6.196	10.663	190.199	6.196	0.000%
38	-6.612	-190.199	-11.473	6.612	190.199	11.473	0.000%
39	0.002	-88.069	-8.095	-0.002	88.069	8.095	0.000%
40	3.656	-88.069	-6.347	-3.656	88.069	6.347	0.000%
41	6.257	-88.069	-3.622	-6.257	88.069	3.622	0.000%
42	7.270	-88.069	0.002	-7.270	88.069	-0.002	0.000%
43	6.591	-88.069	3.817	-6.591	88.069	-3.817	0.000%
44	4.128	-88.069	7.164	-4.128	88.069	-7.164	0.000%
45	0.006	-88.069	8.095	-0.006	88.069	-8.095	0.000%
46	-3.663	-88.069	6.347	3.663	88.069	-6.347	0.000%
47	-6.264	-88.069	3.624	6.264	88.069	-3.624	0.000%
48	-7.279	-88.069	-0.001	7.279	88.069	0.001	0.000%
49	-6.598	-88.069	-3.818	6.598	88.069	3.818	0.000%
50	-4.135	-88.069	-7.161	4.135	88.069	7.161	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00008526
3	Yes	5	0.00000001	0.00004310
4	Yes	5	0.00000001	0.00055376
5	Yes	5	0.00000001	0.00028014
6	Yes	5	0.00000001	0.00045330
7	Yes	5	0.00000001	0.00022709
8	Yes	5	0.00000001	0.00007436
9	Yes	5	0.00000001	0.00003790
10	Yes	5	0.00000001	0.00052156
11	Yes	5	0.00000001	0.00026130
12	Yes	5	0.00000001	0.00059474
13	Yes	5	0.00000001	0.00029556
14	Yes	5	0.00000001	0.00009014
15	Yes	5	0.00000001	0.00004562
16	Yes	5	0.00000001	0.00045911
17	Yes	5	0.00000001	0.00022981
18	Yes	5	0.00000001	0.00054371
19	Yes	5	0.00000001	0.00027531
20	Yes	5	0.00000001	0.00006972
21	Yes	5	0.00000001	0.00003545
22	Yes	5	0.00000001	0.00050103
23	Yes	5	0.00000001	0.00025116
24	Yes	5	0.00000001	0.00054642
25	Yes	5	0.00000001	0.00027109
26	Yes	4	0.00000001	0.00027122
27	Yes	6	0.00000001	0.00012790
28	Yes	6	0.00000001	0.00013257
29	Yes	6	0.00000001	0.00013019
30	Yes	6	0.00000001	0.00012684
31	Yes	6	0.00000001	0.00013574
32	Yes	6	0.00000001	0.00014566

33	Yes	6	0.00000001	0.00013011
34	Yes	6	0.00000001	0.00012864
35	Yes	6	0.00000001	0.00012791
36	Yes	6	0.00000001	0.00012127
37	Yes	6	0.00000001	0.00012811
38	Yes	6	0.00000001	0.00013810
39	Yes	4	0.00000001	0.00012578
40	Yes	4	0.00000001	0.00021867
41	Yes	4	0.00000001	0.00016919
42	Yes	4	0.00000001	0.00011574
43	Yes	4	0.00000001	0.00018564
44	Yes	4	0.00000001	0.00021185
45	Yes	4	0.00000001	0.00012930
46	Yes	4	0.00000001	0.00016900
47	Yes	4	0.00000001	0.00021258
48	Yes	4	0.00000001	0.00011241
49	Yes	4	0.00000001	0.00017072
50	Yes	4	0.00000001	0.00018300

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.667 - 181.583	16.965	44	0.829	0.007
L2	181.583 - 141.417	15.219	44	0.825	0.005
L3	141.417 - 121.167	8.777	44	0.629	0.002
L4	121.167 - 110.042	6.319	44	0.518	0.002
L5	110.042 - 105.083	5.176	44	0.460	0.001
L6	105.083 - 100.917	4.711	44	0.436	0.001
L7	100.917 - 95.833	4.339	44	0.416	0.001
L8	95.833 - 89.917	3.909	44	0.390	0.001
L9	89.917 - 80.833	3.443	44	0.363	0.001
L10	80.833 - 69.5	2.787	44	0.324	0.001
L11	69.5 - 60.583	2.072	44	0.277	0.001
L12	60.583 - 52.167	1.586	44	0.242	0.000
L13	52.167 - 40.333	1.188	44	0.210	0.000
L14	40.333 - 28	0.717	44	0.168	0.000
L15	28 - 20.083	0.347	44	0.117	0.000
L16	20.083 - 17	0.179	44	0.086	0.000
L17	17 - 11.667	0.128	44	0.071	0.000
L18	11.667 - 9.375	0.061	44	0.049	0.000
L19	9.375 - 4.833	0.040	44	0.039	0.000
L20	4.833 - 0	0.011	44	0.021	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	OGB4-900D	44	16.965	0.829	0.007	318263
191.667	Lightning Rod 5/8" x 4' on 4' Pole	44	16.965	0.829	0.007	318263
191.000	DB589-A	44	16.850	0.829	0.007	318263
184.000	LNX-6515DS-VTM w/ Mount Pipe	44	15.637	0.827	0.006	194738
178.000	4' ICE SHIELDS	44	14.600	0.818	0.005	53970
160.000	(2) HBXX-6517DS-VTM w/ Mount	44	11.571	0.741	0.003	12381

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
158.000	SRL-224NM-4	44	11.250	0.729	0.003	11400
151.000	7770.00 w/ Mount Pipe	44	10.160	0.687	0.003	8924
148.000	TME-RRUS 11 B2	44	9.712	0.668	0.003	8164
138.000	4' ICE SHIELDS	44	8.320	0.609	0.002	7414
132.000	SRL-235-2	44	7.564	0.576	0.002	8554
124.000	PCS 1900 TMA RX	44	6.631	0.533	0.002	10755
120.000	Andrew VHLP2-18	44	6.193	0.512	0.001	11495
116.000	(3) 844G65VTZAS w/ Mount Pipe	44	5.772	0.491	0.001	11119
98.000	4' ICE SHIELDS	44	4.089	0.401	0.001	11598
90.000	KP2F-34	44	3.449	0.364	0.001	13115
70.000	SRL-235-2	44	2.101	0.279	0.001	13883
33.000	DB909XVTE-M	44	0.482	0.137	0.000	14098

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	191.667 - 181.583	79.369	12	3.869	0.032
L2	181.583 - 141.417	71.220	12	3.855	0.025
L3	141.417 - 121.167	41.117	12	2.943	0.011
L4	121.167 - 110.042	29.613	12	2.429	0.007
L5	110.042 - 105.083	24.258	12	2.157	0.006
L6	105.083 - 100.917	22.077	12	2.043	0.005
L7	100.917 - 95.833	20.335	12	1.950	0.005
L8	95.833 - 89.917	18.323	12	1.828	0.004
L9	89.917 - 80.833	16.135	12	1.703	0.004
L10	80.833 - 69.5	13.065	12	1.521	0.003
L11	69.5 - 60.583	9.710	12	1.300	0.003
L12	60.583 - 52.167	7.436	12	1.133	0.002
L13	52.167 - 40.333	5.566	12	0.986	0.002
L14	40.333 - 28	3.360	12	0.790	0.001
L15	28 - 20.083	1.627	12	0.547	0.001
L16	20.083 - 17	0.838	12	0.403	0.001
L17	17 - 11.667	0.600	12	0.335	0.001
L18	11.667 - 9.375	0.284	12	0.229	0.000
L19	9.375 - 4.833	0.185	12	0.183	0.000
L20	4.833 - 0	0.050	12	0.099	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
192.000	OGB4-900D	12	79.369	3.869	0.032	67820
191.667	Lightning Rod 5/8" x 4' on 4' Pole	12	79.369	3.869	0.032	67820
191.000	DB589-A	12	78.829	3.869	0.032	67820
184.000	LNX-6515DS-VTM w/ Mount Pipe	12	73.172	3.866	0.027	43605
178.000	4' ICE SHIELDS	12	68.331	3.825	0.023	12601
160.000	(2) HBXX-6517DS-VTM w/ Mount Pipe	12	54.184	3.468	0.015	2691

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.000	SRL-224NM-4	12	52.681	3.414	0.015	2474
151.000	7770.00 w/ Mount Pipe	12	47.584	3.216	0.013	1929
148.000	TME-RRUS 11 B2	12	45.490	3.130	0.012	1762
138.000	4' ICE SHIELDS	12	38.980	2.851	0.010	1596
132.000	SRL-235-2	12	35.438	2.697	0.009	1841
124.000	PCS 1900 TMA RX	12	31.075	2.499	0.008	2314
120.000	Andrew VHLP2-18	12	29.023	2.400	0.007	2471
116.000	(3) 844G65VTZAS w/ Mount Pipe	12	27.048	2.301	0.006	2387
98.000	4' ICE SHIELDS	12	19.166	1.880	0.004	2478
90.000	KP2F-34	12	16.165	1.705	0.004	2802
70.000	SRL-235-2	12	9.847	1.310	0.003	2963
33.000	DB909XVTE-M	12	2.257	0.644	0.001	3007

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	191.667 - 181.583 (1)	P18x3/8	10.084	0.000	0.0	20.764	-11.243	784.878	0.014
L2	181.583 - 141.417 (2)	P24x3/8	40.166	0.000	0.0	27.833	-16.746	1052.070	0.016
L3	141.417 - 121.167 (3)	P36x3/8	20.250	0.000	0.0	41.970	-23.073	1490.100	0.015
L4	121.167 - 110.042 (4)	P42x3/8	11.125	0.000	0.0	49.038	-28.952	1668.870	0.017
L5	110.042 - 105.083 (5)	P42x3/8 [0.491966]	4.959	0.000	0.0	64.153	-30.787	2258.970	0.014
L6	105.083 - 100.917 (6)	P42x3/8 [0.560722]	4.166	0.000	0.0	72.998	-33.374	2511.220	0.013
L7	100.917 - 95.833 (7)	P48x3/8	5.084	0.000	0.0	56.107	-35.327	1847.490	0.019
L8	95.833 - 89.917 (8)	P48x3/8 [0.478186]	5.916	0.000	0.0	71.390	-37.711	2400.900	0.016
L9	89.917 - 80.833 (9)	P48x3/8 [0.578153]	9.084	0.000	0.0	86.133	-44.019	2953.780	0.015
L10	80.833 - 69.5 (10)	P54x3/8 [0.487033]	11.333	0.000	0.0	81.878	-50.586	2705.260	0.019
L11	69.5 - 60.583 (11)	P54x3/8 [0.591202]	8.917	0.000	0.0	99.197	-62.279	3367.630	0.018
L12	60.583 - 52.167 (12)	P60x3/8 [0.514746]	8.416	0.000	0.0	96.195	-67.759	3120.260	0.022
L13	52.167 - 40.333 (13)	P60x3/8 [0.620238]	11.834	0.000	0.0	115.704	-76.217	3832.980	0.020
L14	40.333 - 28 (14)	P60x1/2 [0.597937]	12.333	0.000	0.0	111.585	-84.405	3822.170	0.022
L15	28 - 20.083 (15)	P60x1/2 [0.720286]	7.917	0.000	0.0	134.141	-90.896	4668.760	0.019
L16	20.083 - 17 (16)	P60x5/8	3.083	0.000	0.0	116.583	-93.232	4139.150	0.023
L17	17 - 11.667 (17)	P60x5/8 [0.72746]	5.333	0.000	0.0	135.460	-97.592	4913.120	0.020

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L18	11.667 - 9.375 (18)	P60x5/8 [0.750143]	2.292	0.000	0.0	139.631	-99.123	5010.690	0.020
L19	9.375 - 4.833 (19)	P60x5/8 [0.831253]	4.542	0.000	0.0	154.517	-102.323	5144.780	0.020
L20	4.833 - 0 (20)	P60x5/8 [0.782103]	4.833	0.000	0.0	145.501	-105.675	4985.920	0.021

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	191.667 - 181.583 (1)	P18x3/8	8.630	367.000	0.024	0.000	367.000	0.000
L2	181.583 - 141.417 (2)	P24x3/8	405.457	623.717	0.650	0.000	623.717	0.000
L3	141.417 - 121.167 (3)	P36x3/8	792.334	1338.808	0.592	0.000	1338.808	0.000
L4	121.167 - 110.042 (4)	P42x3/8	1049.517	1796.558	0.584	0.000	1796.558	0.000
L5	110.042 - 105.083 (5)	P42x3/8 [0.491966]	1173.392	2290.233	0.512	0.000	2290.233	0.000
L6	105.083 - 100.917 (6)	P42x3/8 [0.560722]	1282.458	2588.000	0.496	0.000	2588.000	0.000
L7	100.917 - 95.833 (7)	P48x3/8	1420.008	2321.108	0.612	0.000	2321.108	0.000
L8	95.833 - 89.917 (8)	P48x3/8 [0.478186]	1584.600	2872.517	0.552	0.000	2872.517	0.000
L9	89.917 - 80.833 (9)	P48x3/8 [0.578153]	1844.867	3430.650	0.538	0.000	3430.650	0.000
L10	80.833 - 69.5 (10)	P54x3/8 [0.487033]	2182.783	3713.675	0.588	0.000	3713.675	0.000
L11	69.5 - 60.583 (11)	P54x3/8 [0.591202]	2474.033	4432.000	0.558	0.000	4432.000	0.000
L12	60.583 - 52.167 (12)	P60x3/8 [0.514746]	2762.383	4794.208	0.576	0.000	4794.208	0.000
L13	52.167 - 40.333 (13)	P60x3/8 [0.620238]	3180.308	5658.025	0.562	0.000	5658.025	0.000
L14	40.333 - 28 (14)	P60x1/2 [0.597937]	3629.942	5739.533	0.632	0.000	5739.533	0.000
L15	28 - 20.083 (15)	P60x1/2 [0.720286]	3925.042	6759.225	0.581	0.000	6759.225	0.000
L16	20.083 - 17 (16)	P60x5/8	4041.092	6198.183	0.652	0.000	6198.183	0.000
L17	17 - 11.667 (17)	P60x5/8 [0.72746]	4243.167	7100.833	0.598	0.000	7100.833	0.000
L18	11.667 - 9.375 (18)	P60x5/8 [0.750143]	4330.483	7258.550	0.597	0.000	7258.550	0.000
L19	9.375 - 4.833 (19)	P60x5/8 [0.831253]	4504.408	7661.458	0.588	0.000	7661.458	0.000
L20	4.833 - 0 (20)	P60x5/8 [0.782103]	4690.700	7319.941	0.641	0.000	7319.941	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	191.667 - 181.583 (1)	P18x3/8	1.826	392.439	0.005	0.368	564.642	0.001
L2	181.583 - 141.417 (2)	P24x3/8	17.678	526.035	0.034	0.226	1019.708	0.000
L3	141.417 - 121.167 (3)	P36x3/8	20.461	745.048	0.027	1.674	2189.067	0.001
L4	121.167 - 110.042 (4)	P42x3/8	24.721	834.437	0.030	2.374	2868.842	0.001
L5	110.042 - 105.083 (5)	P42x3/8 [0.491966]	25.216	1129.480	0.022	2.374	3861.667	0.001
L6	105.083 - 100.917 (6)	P42x3/8 [0.560722]	26.745	1255.610	0.021	3.848	4278.867	0.001
L7	100.917 - 95.833 (7)	P48x3/8	27.354	923.745	0.030	3.848	3637.700	0.001
L8	95.833 - 89.917 (8)	P48x3/8 [0.478186]	28.196	1200.450	0.023	4.625	4707.092	0.001
L9	89.917 - 80.833 (9)	P48x3/8 [0.578153]	29.192	1476.890	0.020	4.624	5766.967	0.001
L10	80.833 - 69.5 (10)	P54x3/8 [0.487033]	30.830	1352.630	0.023	4.624	5978.025	0.001
L11	69.5 - 60.583 (11)	P54x3/8 [0.591202]	33.838	1683.810	0.020	1.093	7413.067	0.000
L12	60.583 - 52.167 (12)	P60x3/8 [0.514746]	34.675	1560.130	0.022	1.093	7667.950	0.000
L13	52.167 - 40.333 (13)	P60x3/8 [0.620238]	35.907	1916.490	0.019	1.092	9386.417	0.000
L14	40.333 - 28 (14)	P60x1/2 [0.597937]	36.964	1911.090	0.019	1.469	9366.833	0.000
L15	28 - 20.083 (15)	P60x1/2 [0.720286]	37.519	2334.380	0.016	1.469	11395.000	0.000
L16	20.083 - 17 (16)	P60x5/8	37.704	2069.580	0.018	1.469	10134.583	0.000
L17	17 - 11.667 (17)	P60x5/8 [0.72746]	38.027	2456.560	0.015	1.469	11988.583	0.000
L18	11.667 - 9.375 (18)	P60x5/8 [0.750143]	38.157	2505.350	0.015	1.469	12217.416	0.000
L19	9.375 - 4.833 (19)	P60x5/8 [0.831253]	38.415	2572.390	0.015	1.469	12510.500	0.000
L20	4.833 - 0 (20)	P60x5/8 [0.782103]	38.666	2492.960	0.016	1.469	12144.083	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	191.667 - 181.583 (1)	0.014	0.024	0.000	0.005	0.001	0.033 ✔	1.000	4.8.2 ✔
L2	181.583 - 141.417 (2)	0.016	0.650	0.000	0.034	0.000	0.666 ✔	1.000	4.8.2 ✔
L3	141.417 - 121.167 (3)	0.015	0.592	0.000	0.027	0.001	0.607 ✔	1.000	4.8.2 ✔
L4	121.167 - 110.042 (4)	0.017	0.584	0.000	0.030	0.001	0.602 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L5	110.042 - 105.083 (5)	0.014	0.512	0.000	0.022	0.001	0.526 ✔	1.000	4.8.2 ✔
L6	105.083 - 100.917 (6)	0.013	0.496	0.000	0.021	0.001	0.509 ✔	1.000	4.8.2 ✔
L7	100.917 - 95.833 (7)	0.019	0.612	0.000	0.030	0.001	0.631 ✔	1.000	4.8.2 ✔
L8	95.833 - 89.917 (8)	0.016	0.552	0.000	0.023	0.001	0.568 ✔	1.000	4.8.2 ✔
L9	89.917 - 80.833 (9)	0.015	0.538	0.000	0.020	0.001	0.553 ✔	1.000	4.8.2 ✔
L10	80.833 - 69.5 (10)	0.019	0.588	0.000	0.023	0.001	0.607 ✔	1.000	4.8.2 ✔
L11	69.5 - 60.583 (11)	0.018	0.558	0.000	0.020	0.000	0.577 ✔	1.000	4.8.2 ✔
L12	60.583 - 52.167 (12)	0.022	0.576	0.000	0.022	0.000	0.598 ✔	1.000	4.8.2 ✔
L13	52.167 - 40.333 (13)	0.020	0.562	0.000	0.019	0.000	0.582 ✔	1.000	4.8.2 ✔
L14	40.333 - 28 (14)	0.022	0.632	0.000	0.019	0.000	0.654 ✔	1.000	4.8.2 ✔
L15	28 - 20.083 (15)	0.019	0.581	0.000	0.016	0.000	0.600 ✔	1.000	4.8.2 ✔
L16	20.083 - 17 (16)	0.023	0.652	0.000	0.018	0.000	0.675 ✔	1.000	4.8.2 ✔
L17	17 - 11.667 (17)	0.020	0.598	0.000	0.015	0.000	0.617 ✔	1.000	4.8.2 ✔
L18	11.667 - 9.375 (18)	0.020	0.597	0.000	0.015	0.000	0.616 ✔	1.000	4.8.2 ✔
L19	9.375 - 4.833 (19)	0.020	0.588	0.000	0.015	0.000	0.608 ✔	1.000	4.8.2 ✔
L20	4.833 - 0 (20)	0.021	0.641	0.000	0.016	0.000	0.662 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	191.667 - 181.583	Pole	P18x3/8	1	-11.243	784.878	**	**
L2	181.583 - 141.417	Pole	P24x3/8	2	-16.746	1052.070	**	**
L3	141.417 - 121.167	Pole	P36x3/8	3	-23.073	1490.100	**	**
L4	121.167 - 110.042	Pole	P42x3/8	4	-28.952	1668.870	**	**
L5	110.042 - 105.083	Pole	P42x3/8 [0.491966]	5	-30.787	2258.970	**	**
L6	105.083 -	Pole	P42x3/8 [0.560722]	6	-33.374	2511.220	**	**

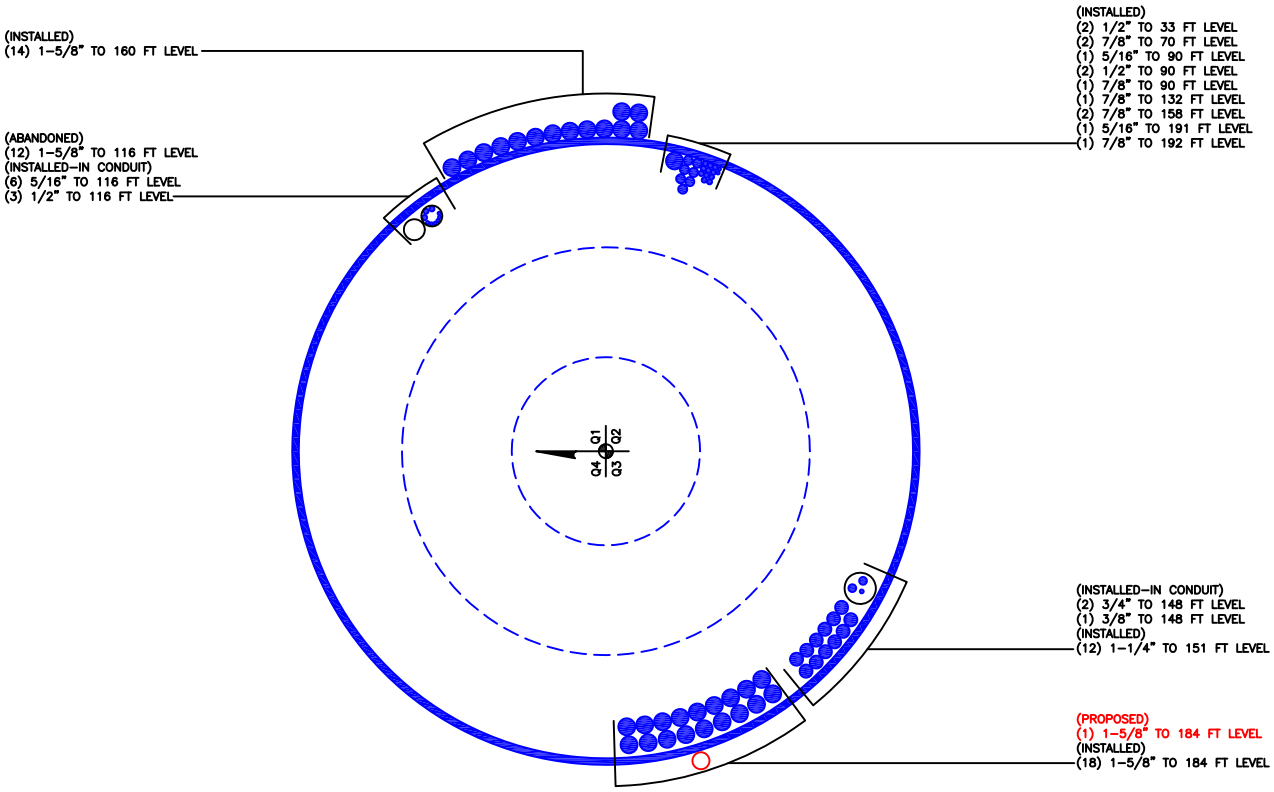
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
	100.917							
L7	100.917 - 95.833	Pole	P48x3/8	7	-35.327	1847.490	**	**
L8	95.833 - 89.917	Pole	P48x3/8 [0.478186]	8	-37.711	2400.900	**	**
L9	89.917 - 80.833	Pole	P48x3/8 [0.578153]	9	-44.019	2953.780	**	**
L10	80.833 - 69.5	Pole	P54x3/8 [0.487033]	10	-50.586	2705.260	**	**
L11	69.5 - 60.583	Pole	P54x3/8 [0.591202]	11	-62.279	3367.630	**	**
L12	60.583 - 52.167	Pole	P60x3/8 [0.514746]	12	-67.759	3120.260	**	**
L13	52.167 - 40.333	Pole	P60x3/8 [0.620238]	13	-76.217	3832.980	**	**
L14	40.333 - 28	Pole	P60x1/2 [0.597937]	14	-84.405	3822.170	**	**
L15	28 - 20.083	Pole	P60x1/2 [0.720286]	15	-90.896	4668.760	**	**
L16	20.083 - 17	Pole	P60x5/8	16	-93.232	4139.150	**	**
L17	17 - 11.667	Pole	P60x5/8 [0.72746]	17	-97.592	4913.120	**	**
L18	11.667 - 9.375	Pole	P60x5/8 [0.750143]	18	-99.123	5010.690	**	**
L19	9.375 - 4.833	Pole	P60x5/8 [0.831253]	19	-102.323	5144.780	**	**
L20	4.833 - 0	Pole	P60x5/8 [0.782103]	20	-105.675	4985.920	**	**
							Summary	
						Pole (L16)	**	**
						RATING =	**	**

** See Appendix C for additional calculations

Program Version 7.0.5.1

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT:826217

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement 1

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	9.375	2	CCI-XFP-040075	F	0	T&C
20.083	40.333	3	CCI-XFP-060100	F	0	T&C
40.333	60.583	3	CCI-XFP-065125	F	0	T&C
60.583	80.833	3	CCI-XFP-060100	F	0	T&C
80.833	89.917	3	CCI-XFP-045100	F	0	T&C
100.917	105.083	3	CCI-XFP-040075	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 2

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
4.833	11.667	1	CCI-XFP-040075	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Reinforcement 3

Bottom	Top	QTY	Type	Position	Gap	Ten/Comp
0	17	4	CCI-XFP-060100	F	0	T&C
20.083	28	4	CCI-XFP-060100	F	0	T&C
40.333	52.167	4	CCI-XFP-060100	F	0	T&C
60.583	69.5	4	CCI-XFP-045100	F	0	T&C
80.833	95.833	3	CCI-XFP-045100	F	0	T&C
100.917	110.042	3	CCI-XFP-045100	F	0	T&C
				F	0	T&C
				F	0	T&C
				F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Shaft Capacity	Reinf. 1 QTY	Reinf. 1 Type	Rein. 1 Capacity	Reinf. 2 QTY	Reinf. 2 Type	Rein. 2 Capacity	Reinf. 3 QTY	Reinf. 3 Type	Rein. 3 Capacity	Control Stress Ratio	Top Height	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thickness	Equivalent Shaft Fy	Equivalent Weight Mult.		Bottom Elevation Failure	Top Elevation Failure	Section Failure %
181.5830	191.6670	0.3750	42	57	3.3%										**3.3%**	191.6670	10.0840	0.0000	Round	18.0000	18.0000	0.3750	42.0	1.00	1			
141.4170	181.5830	0.3750	42	57	66.6%										**66.6%**	181.5830	40.1660	0.0000	Round	24.0000	24.0000	0.3750	42.0	1.00	2			
121.1670	141.4170	0.3750	42	57	60.7%										**60.7%**	141.4170	20.2500	0.0000	Round	36.0000	36.0000	0.3750	42.0	1.00	3			
110.0420	121.1670	0.3750	42	57	60.2%										**60.2%**	121.1670	11.1250	0.0000	Round	42.0000	42.0000	0.3750	42.0	1.00	4			
105.0830	110.0420	0.3750	42	57	52.6%							3	CI-XFP-0451(	50.3%	**52.6%**	110.0420	4.9590	0.0000	Round	42.0000	42.0000	0.4920	40.3	1.05	5			
100.9170	105.0830	0.3750	42	57	50.9%	3	CI-XFP-04007	45.3%				3	CI-XFP-0451(	48.4%	**50.9%**	105.0830	4.1660	0.0000	Round	42.0000	42.0000	0.5607	37.5	1.04	6			
95.8330	100.9170	0.3750	42	57	63.1%										**63.1%**	100.9170	5.0840	0.0000	Round	48.0000	48.0000	0.3750	42.0	1.00	7			
89.9170	95.8330	0.3750	42	57	56.8%							3	CI-XFP-0451(	52.7%	**56.8%**	95.8330	5.9160	0.0000	Round	48.0000	48.0000	0.4782	40.9	1.04	8			
80.8330	89.9170	0.3750	42	57	55.3%	3	CI-XFP-0451(	51.4%				3	CI-XFP-0451(	49.6%	**55.3%**	89.9170	9.0840	0.0000	Round	48.0000	48.0000	0.5782	39.8	1.02	9			
69.5000	80.8330	0.3750	42	57	60.7%	3	CI-XFP-0601(	50.6%							**60.7%**	80.8330	11.3330	0.0000	Round	54.0000	54.0000	0.4870	40.9	0.99	10			
60.5830	69.5000	0.3750	42	57	57.7%	3	CI-XFP-0601(	48.1%				4	CI-XFP-0451(	41.8%	**57.7%**	69.5000	8.9170	0.0000	Round	54.0000	54.0000	0.5912	39.9	1.00	11			
52.1670	60.5830	0.3750	42	57	59.8%	3	CI-XFP-06512	45.6%							**59.8%**	60.5830	8.4160	0.0000	Round	60.0000	60.0000	0.5147	40.8	0.98	12			
40.3330	52.1670	0.3750	42	57	58.2%	3	CI-XFP-06512	45.5%				4	CI-XFP-0601(	34.9%	**58.2%**	52.1670	11.8340	0.0000	Round	60.0000	60.0000	0.6202	39.9	1.03	13			
28.0000	40.3330	0.5000	42	57	65.4%	3	CI-XFP-0601(	50.9%							**65.4%**	40.3330	12.3330	0.0000	Round	60.0000	60.0000	0.5979	41.1	1.00	14			
20.0830	28.0000	0.5000	42	57	60.0%	3	CI-XFP-0601(	47.5%				4	CI-XFP-0601(	37.9%	**60.0%**	28.0000	7.9170	0.0000	Round	60.0000	60.0000	0.7203	40.1	1.01	15			
17.0000	20.0830	0.6250	42	57	67.5%										**67.5%**	20.0830	3.0830	0.0000	Round	60.0000	60.0000	0.6250	42.0	1.00	16			
11.6670	17.0000	0.6250	42	57	61.7%							4	CI-XFP-0601(	35.0%	**61.7%**	17.0000	5.3330	0.0000	Round	60.0000	60.0000	0.7275	41.1	1.04	17			
9.3750	11.6670	0.6250	42	57	61.6%				1	CI-XFP-04007	49.4%	4	CI-XFP-0601(	38.2%	**61.6%**	11.6670	2.2920	0.0000	Round	60.0000	60.0000	0.7501	38.0	1.03	18			
4.8330	9.3750	0.6250	42	57	58.9%	2	CI-XFP-04007	56.1%	1	CI-XFP-04007	60.8%	4	CI-XFP-0601(	48.2%	**60.8%**	9.3750	4.5420	0.0000	Round	60.0000	60.0000	0.8313	37.9	0.99	19			
0.0000	4.8330	0.6250	42	57	66.2%	2	CI-XFP-04007	62.5%				4	CI-XFP-0601(	43.1%	**66.2%**	4.8330	4.8330	0.0000	Round	60.0000	60.0000	0.7821	39.2	1.03	20			
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Section	Loads					Pole									
Section	Elevation (ft)	Moment (ft-kip)	Compression (kip)	Shear (kip)	Torsion (kip-ft)	Number of Sides	OD (in)	Thickness (in)	Yield Strength (ksi)	Flat Width (in)	Area (in²)	Moment of Inertia (in⁴)	Percent of Composite Moment of Inertia	Angle Offset to Pole Flat	Distance to Extreme Fiber (in)
Section	*Elevation*	*Moment*	*Compressio*	*Shear*	*Torsion*	*PoleSides*	*PoleOD*	*PoleT*	*PoleFy*	*PoleW*	*PoleA*	*PoleI*	*PoleIPer*	*PoleCPoint*	*PoleC*
1	191.667	0.0	0.0	0.0	0.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2	181.583	10.2	4.3	4.8	0.1	Round	18.0000	0.3750	42	0.00	20.8	807	100%	TRUE	9.00
3	141.417	405.5	16.7	17.7	0.2	Round	24.0000	0.3750	42	0.00	27.8	1942	100%	TRUE	12.00
4	121.167	792.4	23.1	20.5	1.7	Round	36.0000	0.3750	42	0.00	42.0	6659	100%	TRUE	18.00
5	110.042	1049.5	29.0	24.7	2.4	Round	42.0000	0.3750	42	0.00	49.0	10622	100%	TRUE	21.00
6	105.083	1173.3	30.8	25.2	2.4	Round	42.0000	0.3750	42	0.00	49.0	10625	77%	TRUE	21.25
7	100.917	1282.5	33.4	26.7	3.8	Round	42.0000	0.3750	42	0.00	49.0	10624	68%	TRUE	21.24
8	95.833	1419.9	35.3	27.4	3.8	Round	48.0000	0.3750	42	0.00	56.1	15908	100%	TRUE	24.00
9	89.917	1584.7	37.7	28.2	4.6	Round	48.0000	0.3750	42	0.00	56.1	15917	79%	TRUE	24.39
10	80.833	1844.8	44.0	29.2	4.6	Round	48.0000	0.3750	42	0.00	56.1	15914	66%	TRUE	24.33
11	69.5	2182.8	50.6	30.8	3.0	Round	54.0000	0.3750	42	0.00	63.2	22710	77%	TRUE	27.06
12	60.583	2473.9	62.3	33.8	1.1	Round	54.0000	0.3750	42	0.00	63.2	22710	64%	TRUE	27.05
13	52.167	2762.5	67.8	34.7	1.1	Round	60.0000	0.3750	42	0.00	70.2	31217	73%	TRUE	30.01
14	40.333	3180.2	76.2	35.9	1.1	Round	60.0000	0.3750	42	0.00	70.2	31219	61%	TRUE	30.14
15	28	3629.9	84.4	37.0	1.5	Round	60.0000	0.5000	42	0.00	93.5	41363	84%	TRUE	30.02
16	20.083	3924.9	90.9	37.5	1.5	Round	60.0000	0.5000	42	0.00	93.5	41368	70%	TRUE	30.24
17	17	4041.1	93.2	37.7	1.5	Round	60.0000	0.6250	42	0.00	116.6	51381	100%	TRUE	30.00
18	11.667	4243.3	97.6	38.0	1.5	Round	60.0000	0.6250	42	0.00	116.6	51383	86%	TRUE	30.15
19	9.375	4330.7	99.1	38.1	1.5	Round	60.0000	0.6250	42	0.00	116.6	51395	84%	TRUE	30.35
20	4.833	4504.3	102.3	38.4	1.5	Round	60.0000	0.6250	42	0.00	116.6	51434	76%	TRUE	30.68
21	0	4690.7	105.7	38.7	1.5	Round	60.0000	0.6250	42	0.00	116.6	51589	81%	TRUE	31.34

Section	Unreinforced Pole - Rev. G															
Section	Section Modulus (in³)	Torsion Constant (in⁴)	Effective Yield Stress (ksi)	Nominal Bending Moment Strength (ft-kip)	Strength Resistance Factor	Design Bending Moment Strength (ft-kip)	Nominal Compressive Strength (kip)	Strength Resistance Factor	Design Compressive Strength (kip)	Nominal Shear Strength (kip)	Strength Resistance Factor	Design Shear Strength (kip)	Nominal Torsion Shear Strength (kip-ft)	Strength Resistance Factor	Design Torsion Shear Strength (kip-ft)	Stress Ratio
Section	*PoleS*	*PoleJ*	*PoleFye*	*PoleMn*	*PolePhiF*	*PolePhiMn*	*PolePn*	*PolePhiC*	*PolePhiPn*	*PoleVn*	*PolePhiV*	*PolePhiVn*	*PoleVtn*	*PolePhiVt*	*PolepPhiVt*	***PoleSRG***
1	#N/A	#N/A	#N/A	#N/A	0.9	#N/A	#N/A	0.9	#N/A	#N/A	0.9	#N/A	#N/A	0.9	#N/A	**#N/A**
2	90	1613	42.0	407.8	0.9	367.0	872.1	0.9	784.9	436.0	0.9	392.4	7528.6	0.9	6775.7	**0.033**
3	162	3885	42.0	693.0	0.9	623.7	1169.0	0.9	1052.1	584.5	0.9	526.0	13596.1	0.9	12236.5	**0.667**
4	370	13318	39.4	1487.6	0.9	1338.8	1655.7	0.9	1490.1	827.8	0.9	745.0	29187.5	0.9	26268.8	**0.608**
5	506	21243	37.8	1996.2	0.9	1796.6	1854.3	0.9	1668.9	927.2	0.9	834.4	38251.2	0.9	34426.1	**0.602**
6	500	21243	37.8	1973.2	0.9	1775.9	1854.3	0.9	1668.9	927.2	0.9	834.4	37800.1	0.9	34020.1	**0.680**
7	500	21243	37.8	1974.3	0.9	1776.9	1854.3	0.9	1668.9	927.2	0.9	834.4	37822.2	0.9	34040.0	**0.743**
8	663	31817	36.6	2579.0	0.9	2321.1	2052.8	0.9	1847.5	1026.4	0.9	923.7	48502.6	0.9	43652.4	**0.632**
9	653	31817	36.6	2539.6	0.9	2285.7	2052.8	0.9	1847.5	1026.4	0.9	923.7	47736.8	0.9	42963.1	**0.715**
10	654	31817	36.6	2545.4	0.9	2290.9	2052.8	0.9	1847.5	1026.4	0.9	923.7	47853.2	0.9	43067.9	**0.830**
11	839	45420	35.6	3228.6	0.9	2905.7	2251.1	0.9	2026.0	1125.6	0.9	1013.0	59802.6	0.9	53822.4	**0.777**
12	840	45420	35.6	3230.0	0.9	2907.0	2251.1	0.9	2026.0	1125.6	0.9	1013.0	59828.1	0.9	53845.3	**0.883**
13	1040	62434	34.9	3966.7	0.9	3570.0	2449.4	0.9	2204.4	1224.7	0.9	1102.2	72555.7	0.9	65300.1	**0.806**
14	1036	62434	34.9	3948.9	0.9	3554.0	2449.4	0.9	2204.4	1224.7	0.9	1102.2	72227.6	0.9	65004.8	**0.930**
15	1378	82726	37.2	5397.7	0.9	4857.9	3473.0	0.9	3125.7	1736.5	0.9	1562.8	102415.2	0.9	92173.7	**0.775**
16	1368	82726	37.2	5358.3	0.9	4822.4	3473.0	0.9	3125.7	1736.5	0.9	1562.8	101653.6	0.9	91488.2	**0.844**
17	1713	102761	39.4	6886.9	0.9	6198.2	4599.1	0.9	4139.2	2299.5	0.9	2069.6	135127.3	0.9	121614.6	**0.675**
18	1704	102761	39.4	6853.6	0.9	6168.2	4599.1	0.9	4139.2	2299.5	0.9	2069.6	134467.7	0.9	121020.9	**0.712**
19	1693	102761	39.4	6808.6	0.9	6127.8	4599.1	0.9	4139.2	2299.5	0.9	2069.6	133554.6	0.9	120199.1	**0.731**
20	1676	102761	39.4	6741.3	0.9	6067.2	4599.1	0.9	4139.2	2299.5	0.9	2069.6	132132.5	0.9	118919.2	**0.767**
21	1646	102761	39.4	6619.8	0.9	5957.8	4599.1	0.9	4139.2	2299.5	0.9	2069.6	129361.4	0.9	116425.3	**0.813**
																#N/A

Section	Reinforced Pole					Rev. G				
Section	Moment in Pole when Reinforced	Bending Stress (ksi)	Axial Stress (ksi)	Shear Stress (ksi)	Torsion Shear Stress (ksi)	Allowable Bending Stress (ksi)	Allowable Compressive Stress (ksi)	Allowable Shear Stress (ksi)	Allowable Torsion Shear Stress (ksi)	**Reinforced Pole Stress Ratio**
Section	*PoleMome*	*RPoleFbAc*	*RPoleFaAc*	*RPoleFvAct*	*RPoleFvtAc*	*PoleFbG*	*PoleFpG*	*PoleFvG*	*PoleFvtG*	***RPoleSRG***
1	#N/A	#N/A	#N/A	0.00	#N/A	#N/A	#N/A	#N/A	#N/A	**#N/A**
2	10.2	1.4	0.21	0.00	0.00	49.1	37.8	37.8	37.8	**0.033**
3	405.5	30.1	0.60	0.00	0.00	46.2	37.8	37.8	37.8	**0.666**
4	792.4	25.7	0.55	0.00	0.00	43.4	35.5	35.5	35.5	**0.607**
5	1049.5	24.9	0.59	0.00	0.00	42.6	34.0	34.0	34.0	**0.602**
6	901.6	21.6	0.63	0.00	0.00	42.6	34.0	34.0	34.0	**0.526**
7	869.0	20.8	0.68	0.00	0.00	42.6	34.0	34.0	34.0	**0.509**
8	1419.9	25.7	0.63	0.00	0.00	42.0	32.9	32.9	32.9	**0.631**
9	1250.6	23.0	0.67	0.00	0.00	42.0	32.9	32.9	32.9	**0.568**
10	1211.6	22.2	0.78	0.00	0.00	42.0	32.9	32.9	32.9	**0.553**
11	1690.1	24.2	0.80	0.00	0.00	41.6	32.1	32.1	32.1	**0.607**
12	1587.2	22.7	0.99	0.00	0.00	41.6	32.1	32.1	32.1	**0.577**
13	2025.3	23.4	0.96	0.00	0.00	41.2	31.4	31.4	31.4	**0.598**
14	1945.4	22.5	1.09	0.00	0.00	41.2	31.4	31.4	31.4	**0.582**
15	3048.3	26.5	0.90	0.00	0.00	42.3	33.4	33.4	33.4	**0.654**
16	2753.5	24.2	0.97	0.00	0.00	42.3	33.4	33.4	33.4	**0.600**
17	4041.1	28.3	0.80	0.00	0.00	43.4	35.5	35.5	35.5	**0.675**
18	3662.3	25.8	0.84	0.00	0.00	43.4	35.5	35.5	35.5	**0.617**
19	3629.8	25.7	0.85	0.00	0.00	43.4	35.5	35.5	35.5	**0.616**
20	3423.6	24.5	0.88	0.00	0.00	43.4	35.5	35.5	35.5	**0.589**
21	3791.2	27.6	0.91	0.00	0.00	43.4	35.5	35.5	35.5	**0.662**
										#N/A

Section	Reinforcement 1							
Section	Qty	**Model**	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	**Stress Ratio**
Section	*Rein1Qty*	***Rein1Model***	*Rein1Pos*	*Rein1Gap*	*Rein1TC*	*Rein1ITotal*	*Rein1P*	***Rein1SR***
1								
2								
3								
4								
5								
6								
7	3	**CCI-XFP-040075**	F	0	T&C	1855	55.4	**0.453**
8								
9								
10	3	**CCI-XFP-045100**	F	0	T&C	4065	99.3	**0.514**
11	3	**CCI-XFP-060100**	F	0	T&C	6621	143.3	**0.506**
12	3	**CCI-XFP-060100**	F	0	T&C	6887	136.1	**0.481**
13	3	**CCI-XFP-065125**	F	0	T&C	11364	178.4	**0.456**
14	3	**CCI-XFP-065125**	F	0	T&C	11371	177.9	**0.455**
15	3	**CCI-XFP-060100**	F	0	T&C	7892	144.3	**0.509**
16	3	**CCI-XFP-060100**	F	0	T&C	7918	134.5	**0.475**
17								
18								
19								
20	2	**CCI-XFP-040075**	F	0	T&C	3846	68.7	**0.561**
21	2	**CCI-XFP-040075**	F	0	T&C	3973	76.5	**0.625**
								0.625

Section	Reinforcement 2							
Section	Qty	**Model**	Position (F-Flat, C-Corner)	Gap Between Pole and Back of Rein. (in)	Tension only or Tension & Comp.	Total Moment of Inertia (in⁴)	Axial Force (kip)	**Stress Ratio**
Section	*Rein2Qty*	***Rein2Model***	*Rein2Pos*	*Rein2Gap*	*Rein2TC*	*Rein2ITotal*	*Rein2P*	***Rein2SR***
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19	1	**CCI-XFP-040075**	F	0	T&C	1693	60.4	**0.494**
20	1	**CCI-XFP-040075**	F	0	T&C	2888	74.3	**0.608**
21								
								0.608

Section	Composite							
Section	Centroid Offset (in)	Area (in²)	Moment of Inertia (in⁴)	**Controlling Stress Ratio**	**Thickness (in)**	**Weight Multiplier**	**Derated Yield Stress (ksi)**	**% Error in Derated Yield Stress**
Section	*CompYBar*	*CompA*	*CompI*	***CompSR***	***EPoleT***	***EPoleWM***	***EDPoleFy***	***EDPoleSRCheck***
1	0.000	#N/A	#N/A	**#N/A**	**#N/A**	**1.00**	**#N/A**	**#N/A**
2	0.000	20.8	807	**0.033**	**0.3750**	**1.00**	**42.0**	**0.5%**
3	0.000	27.8	1942	**0.666**	**0.3750**	**1.00**	**42.0**	**0.1%**
4	0.000	42.0	6659	**0.607**	**0.3750**	**1.00**	**42.0**	**0.1%**
5	0.000	49.0	10622	**0.602**	**0.3750**	**1.00**	**42.0**	**0.1%**
6	0.251	67.0	13827	**0.526**	**0.4920**	**1.05**	**40.3**	**2.0%**
7	0.238	76.0	15681	**0.509**	**0.5607**	**1.04**	**37.5**	**1.6%**
8	0.000	56.1	15908	**0.631**	**0.3750**	**1.00**	**42.0**	**0.1%**
9	-0.385	74.1	20168	**0.568**	**0.4782**	**1.04**	**40.9**	**2.6%**
10	0.326	87.6	24231	**0.553**	**0.5782**	**1.02**	**39.8**	**3.7%**
11	-0.063	81.2	29331	**0.607**	**0.4870**	**0.99**	**40.9**	**1.5%**
12	-0.051	99.2	35397	**0.577**	**0.5912**	**1.00**	**39.9**	**3.0%**
13	-0.005	94.6	42581	**0.598**	**0.5147**	**0.98**	**40.8**	**1.8%**
14	-0.141	118.6	51035	**0.582**	**0.6202**	**1.03**	**39.9**	**3.7%**
15	-0.015	111.5	49255	**0.654**	**0.5979**	**1.00**	**41.1**	**1.0%**
16	-0.240	135.5	58968	**0.600**	**0.7203**	**1.01**	**40.1**	**3.1%**
17	0.000	116.6	51381	**0.675**	**0.6250**	**1.00**	**42.0**	**0.0%**
18	-0.147	140.6	59534	**0.617**	**0.7275**	**1.04**	**41.1**	**1.4%**
19	0.353	143.6	61320	**0.616**	**0.7501**	**1.03**	**38.0**	**4.1%**
20	0.680	152.6	67671	**0.608**	**0.8313**	**0.99**	**37.9**	**1.9%**
21	-1.337	149.6	63829	**0.662**	**0.7821**	**1.03**	**39.2**	**2.4%**
				#N/A				

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...atirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	9.375	2	FP-040075	F	T&C
20.083	40.333	3	FP-060100	F	T&C
40.333	60.583	3	FP-065125	F	T&C
60.583	80.833	3	FP-060100	F	T&C
80.833	89.917	3	FP-045100	F	T&C
100.917	105.083	3	FP-040075	F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1																
1	1	1															
1	1	1															
1	1	1															
1	1	1															
1	1	1															

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
4.833	11.667	1	FP-040075	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1
1

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0	17	4	FP-060100	F	T&C
20.083	28	4	FP-060100	F	T&C
40.333	52.167	4	FP-060100	F	T&C
60.583	69.5	4	FP-045100	F	T&C
80.833	95.833	3	FP-045100	F	T&C
100.917	110.042	3	FP-045100	F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	
1	1	1	

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure

5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CCI-XFP-040075	10.2	3.00	0.14	4.00	0.375	0	0.75	4	0	0	1.21875	65	80	0.80	16	1.00	16	81.6	108.8	Rupture	122.3	Rupture
CCI-XFP-045100	15.3	4.50	0.38	7.59	0.5	0	1	4.5	0	0	1.21875	65	80	0.80	20	1.00	20	128.8	171.7	Rupture	193.1	Rupture
CCI-XFP-060100	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16	1.00	16	188.8	251.7	Rupture	283.1	Rupture
CCI-XFP-065125	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.21875	65	80	0.80	19	1.00	19	260.4	347.2	Compress.	391.4	Rupture
CCI-XFP-085125	36.2	10.63	1.38	63.97	0.625	0	1.25	8.5	0	0	1.21875	65	80	0.80	17	1.00	17	350.9	467.9	Compress.	541.4	Rupture

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Mu	8.63	ft-kips
Axial, Pu:	11.243	kips
Shear, Vu:	1.826	kips
Elevation:	180	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	16		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	21		

Plate Data		
Diam:	24	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:		in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	18	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

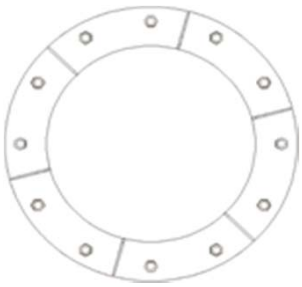
			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	0.53	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.087	in	
Min PL "treq" for actual **T w/ Pry**:	0.082	in	
Min PL "t1" for actual **T w/o Pry**:	0.107	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	0.53	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	1.0%	**Pass**	

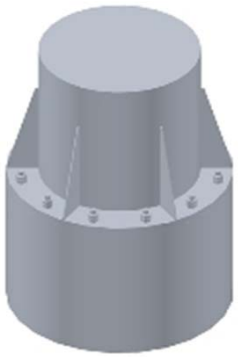
Exterior Flange Plate Results — Flexural Check — Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	TIA G
Allowable Plate Stress:	32.4 ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		10.82
Tension Side Stress Ratio, (treq/t)^2:	0.4% **Pass**	

b/Le>2, Stiffeners are not fully effective

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Mu	405.457	ft-kips
Axial, Pu:	16.746	kips
Shear, Vu:	17.678	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Pirod

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	24		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	33		

Plate Data		
Diam:	36.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	8	in
Thick:	1	in
Notch:	1	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results — Stiffened

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	23.88	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	54.54	kips	<-- B, Stiffened
Prying Force, q:	0.00	kips	Stiffened
Total Bolt Tension=Tu+q:	23.88	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	43.8%	**Pass**	

Exterior Flange Plate Results — Flexural Check — Stiffened

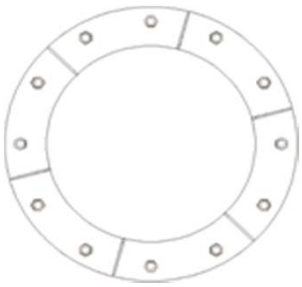
Compression Side Plate Stress:	Rohn/Pirod,	OK	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	Rohn/Pirod,	OK	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

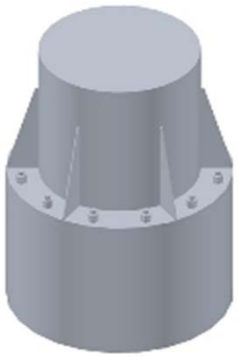
Stiffener Results — N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Bridge Stiffeners @120'**				
DATE	**04/18/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	**792.3 k-ft**	From Risa Model	**Stiffener Width**	**4.500 in**
I =	**7461.4 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.000 in**
ybar =	**22.000 in**		**Stiffener Height**	**39.000 in**
S =	339.15 in^3	I/y	**Fy**	**65 ksi**
fc =	28.03 ksi	M/S	**Fu**	**80 ksi**
Ag =	4.500 in^2		**Step Width**	**3.00 in**
Pu =	126.15 k	fc x Ag	**Bolt Circle**	**39.00 in**
			Number of Bolts	**28**
			Bolt Size	**1**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	0.99	
l =	16.000 in	Unsupported Length
Iy =	.375 in^4	Local Weak Axis Moment of Intertia
Ag =	4.500 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	54.87	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	95.06 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	48.82 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	219.70 k	Nominal Compressive Strength
ΦPn =	197.73 k	Allowable Compressive Strength

Unity% = 63.8 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	4.500 in^2	Gross Area
An =	3.250 in^2	Net Area
Ae =	3.250 in^2	Effective Area
ΦRn =	263.25 k	Tension Yielding: Eqn J4-1
ΦRn =	195.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	195.00 ksi	

Unity% 64.69 %

Moment to Existing Bolt Group:

S_{BG} =	382.64 in^3	# Bolts Acting	7
ft =	24.85 ksi		
Ab =	.785 in^2		
T =	136.61 k		
Arm =	39.00 ksi		
M_{EQ} =	444.0 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Reactions		
Mu	444	ft-kips
Axial, Pu:	23.073	kips
Shear, Vu:	20.461	kips
Elevation:	120	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	39		

Plate Data		
Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	2	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:		in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	18.69	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.017	in	
Min PL "treq" for actual **T w/ Pry**:	0.452	in	
Min PL "t1" for actual **T w/o Pry**:	0.595	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	18.69	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	34.3%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	12.2	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	37.6%	**Pass**	Comp. Y.L. Length:
No Prying			15.00
Tension Side Stress Ratio, (treq/t)^2:	13.1%	**Pass**	

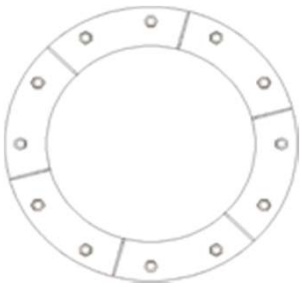
b/Le>2, Stiffeners are not fully effective

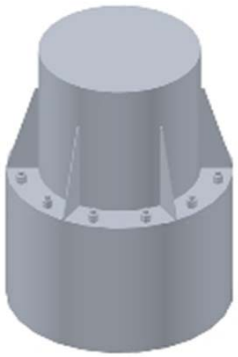
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	444	ft-kips
Axial:	23.073	kips
Shear:	20.461	kips
Exterior Flange Run, T+q:	18.69	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 120 feet

Bolt Data			
Qty:	28		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	39	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	18.7	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	54.5	Kips
Bolt Stress Ratio:	34.3%	**Pass**

Plate Data		
Plate Outer Diam:	41.25	in
Plate Inner Diam:	36	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.63	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	20.3	Kips, Ext. Cu=Interior Cu
Plate Stress:	12.7	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	39.1%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

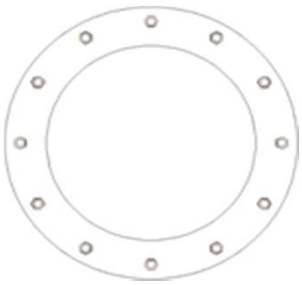
Stiffener Results

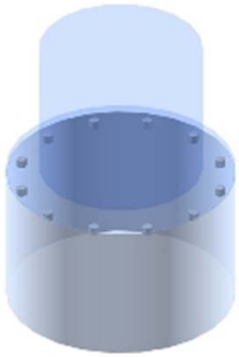
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.375	in
Pole Inner Diam:	41.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Bridge Stiffeners @100'**				
DATE	**04/18/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	**1282.5 k-ft**	From Risa Model
I =	**14381.2 in^4**	From AutoCAD Sketch
ybar =	**25.000 in**	
S =	575.25 in^3	I/y
fc =	26.75 ksi	M/S
Ag =	4.500 in^2	
Pu =	120.39 k	fc x Ag

Stiffener Width	**4.500 in**
Stiffener Thickness	**1.000 in**
Stiffener Height	**58.500 in**
Fy	**65 ksi**
Fu	**80 ksi**
Step Width	**3.00 in**
Bolt Circle	**45.00 in**
Number of Bolts	**32**
Bolt Size	**1**
Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	0.99	
l =	16.500 in	Unsupported Length
Iy =	.375 in^4	Local Weak Axis Moment of Intertia
Ag =	4.500 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	56.59	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	89.39 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	47.94 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	215.75 k	Nominal Compressive Strength
ΦPn =	194.17 k	Allowable Compressive Strength

Unity% = 62.0 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	4.500 in^2	Gross Area
An =	3.250 in^2	Net Area
Ae =	3.250 in^2	Effective Area
ΦRn =	263.25 k	Tension Yielding: Eqn J4-1
ΦRn =	195.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	195.00 ksi	

Unity% 61.74 %

Moment to Existing Bolt Group:

S_{BG} =	639.16 in^3	# Bolts Acting	8
ft =	24.08 ksi		
Ab =	.785 in^2		
T =	151.28 k		
Arm =	45.00 ksi		
M_{EQ} =	567.3 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Mu	567.3	ft-kips
Axial, Pu:	33.374	kips
Shear, Vu:	26.745	kips
Elevation:	100	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	45		

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:		in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results — Stiffened

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	17.87	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	54.54	kips	<-- B, Stiffened
Prying Force, q:	0.00	kips	Stiffened
Total Bolt Tension=Tu+q:	17.87	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	32.8%	**Pass**	

Exterior Flange Plate Results — Flexural Check — Stiffened

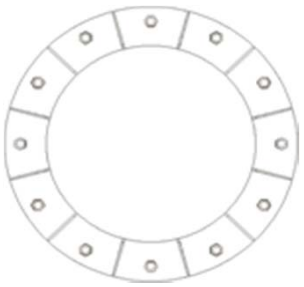
Compression Side Plate Stress:	11.8	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	36.5%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

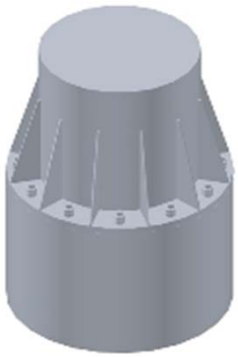
Stiffener Results

Horizontal Weld :	30.7%	**Pass**
Vertical Weld:	22.6%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	14.1%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	21.3%	**Pass**
Plate Comp. (AISC Bracket):	40.7%	**Pass**

Pole Results

Pole Punching Shear Check:	12.4%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Moment:	567.3	ft-kips
Axial:	33.374	kips
Shear:	26.745	kips
Exterior Flange Run, T+q:	17.87	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Manufacturer:	Other

Elevation: 100 feet

Bolt Data			
Qty:	32		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	45	in	

Interior Flange Bolt Results
Maximum Bolt Tension, Tu: 17.9 Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty), 54.5 Kips
Bolt Stress Ratio: 32.8% **Pass**

Plate Data		
Plate Outer Diam:	47.25	in
Plate Inner Diam:	42	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.64	in

Interior Flange Plate Results Flexural Check
Controlling Bolt Axial Force: 20.0 Kips, Ext. Cu=Interior Cu
Plate Stress: 12.4 ksi
Allowable Plate Stress, φ*Fy: 32.4 ksi
Plate Stress Ratio: 38.2% **Pass**

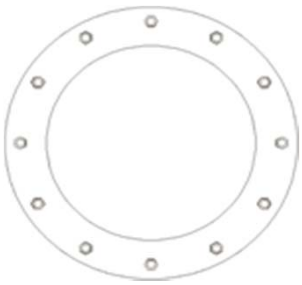
Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

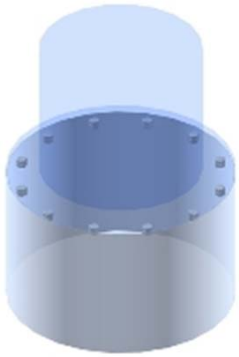
n/a

Stiffener Results
Horizontal Weld : n/a
Vertical Weld: n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
Plate Comp. (AISC Bracket): n/a

Pole Results
Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.375	in
Pole Inner Diam:	47.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Bridge Stiffeners @80'**				
DATE	**04/18/17**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	**1844.9 k-ft**	From Risa Model
I =	**24813.4 in^4**	From AutoCAD Sketch
ybar =	**28.000 in**	
S =	886.19 in^3	I/y
fc =	24.98 ksi	M/S
Ag =	4.500 in^2	
Pu =	112.42 k	fc x Ag

Stiffener Width	**4.500 in**
Stiffener Thickness	**1.000 in**
Stiffener Height	**111.000 in**
Fy	**65 ksi**
Fu	**80 ksi**
Step Width	**3.00 in**
Bolt Circle	**51.00 in**
Number of Bolts	**36**
Bolt Size	**1**
Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	0.99	
l =	16.000 in	Unsupported Length
Iy =	.375 in^4	Local Weak Axis Moment of Intertia
Ag =	4.500 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	54.87	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	95.06 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	48.82 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	219.70 k	Nominal Compressive Strength
ΦPn =	197.73 k	Allowable Compressive Strength

Unity% = 56.9 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	4.500 in^2	Gross Area
An =	3.250 in^2	Net Area
Ae =	3.250 in^2	Effective Area
ΦRn =	263.25 k	Tension Yielding: Eqn J4-1
ΦRn =	195.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	195.00 ksi	

Unity% 57.65 %

Moment to Existing Bolt Group:

S_{BG} =	973.07 in^3	# Bolts Acting	9
ft =	22.75 ksi		
Ab =	.785 in^2		
T =	160.82 k		
Arm =	51.00 ksi		
M_{EQ} =	683.5 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Mu	683.5	ft-kips
Axial, Pu:	44.019	kips
Shear, Vu:	29.192	kips
Elevation:	80	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	51		

Plate Data		
Diam:	54	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	5	in
Thick:	0.625	in
Notch:		in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results — Stiffened

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	16.65	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	Stiffened	in	
Min PL "treq" for actual **T w/ Pry**:	Stiffened	in	
Min PL "t1" for actual **T w/o Pry**:	Stiffened	in	
T allowable	54.54	kips	<-- B, Stiffened
Prying Force, q:	0.00	kips	Stiffened
Total Bolt Tension=Tu+q:	16.65	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	30.5%	**Pass**	

Exterior Flange Plate Results — Flexural Check — Stiffened

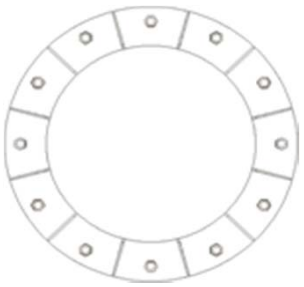
Compression Side Plate Stress:	11.3	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	34.9%	**Pass**	Comp. Y.L. Length:
Stiffened			N/A, Roark
Tension Side Stress Ratio, (treq/t)^2:	N/A		

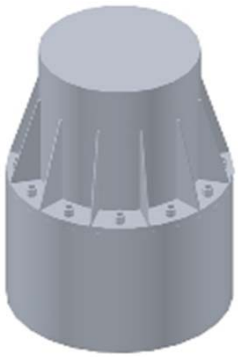
Stiffener Results

Horizontal Weld :	28.9%	**Pass**
Vertical Weld:	21.3%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	13.1%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	20.0%	**Pass**
Plate Comp. (AISC Bracket):	38.3%	**Pass**

Pole Results

Pole Punching Shear Check:	11.7%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Moment:	683.5	ft-kips
Axial:	44.19	kips
Shear:	29.192	kips
Exterior Flange Run, T+q:	16.65	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Manufacturer:	Other

Elevation: 80 feet

Bolt Data			
Qty:	36		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	51	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	16.7	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty),	54.5	Kips
Bolt Stress Ratio:	30.5%	**Pass**

Plate Data		
Plate Outer Diam:	53.25	in
Plate Inner Diam:	48	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	4.65	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	19.1	Kips, Ext. Cu=Interior Cu
Plate Stress:	11.8	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	36.5%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

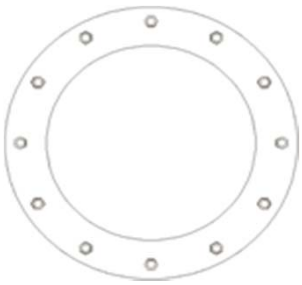
Stiffener Results

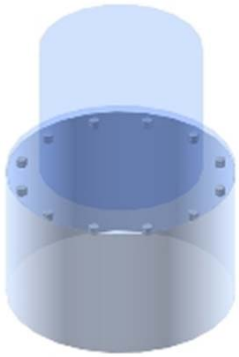
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	54	in
Thick:	0.375	in
Pole Inner Diam:	53.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Existing and New Bridge Stiffeners @ 60'**				
DATE	**04/18/17**	PAGE	1	OF	1

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1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

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Determine Load to Bridge Stiffener:

M =	**2474.0 k-ft**	From Risa Model	**Stiffener Width**	**4.500 in**
I =	**50598.5 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.000 in**
ybar =	**31.000 in**		**Stiffener Height**	**159.000 in**
S =	1632.21 in^3	I/y	**Fy**	**65 ksi**
fc =	18.19 ksi	M/S	**Fu**	**80 ksi**
Ag =	4.500 in^2		**Step Width**	**3.00 in**
Pu =	81.85 k	fc x Ag	**Bolt Circle**	**57.00 in**
			Number of Bolts	**48**
			Bolt Size	**1**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag		Eqn E3-1, AISC 13th Edition, Section E3.
K =	0.99	
l =	16.500 in	Unsupported Length
Iy =	.375 in^4	Local Weak Axis Moment of Intertia
Ag =	4.500 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	56.59	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	89.39 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	47.94 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	215.75 k	Nominal Compressive Strength
ΦPn =	194.17 k	Allowable Compressive Strength

Unity% = 42.2 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	4.500 in^2	Gross Area
An =	3.250 in^2	Net Area
Ae =	3.250 in^2	Effective Area
ΦRn =	263.25 k	Tension Yielding: Eqn J4-1
ΦRn =	195.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	195.00 ksi	

Unity% 41.97 %

Moment to Existing Bolt Group:

S_{BG} =	1775.38 in^3	# Bolts Acting	12
ft =	16.72 ksi		
Ab =	.785 in^2		
T =	157.60 k		
Arm =	57.00 ksi		
M_{EQ} =	748.6 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Mu	748.6	ft-kips
Axial, Pu:	62.279	kips
Shear, Vu:	33.838	kips
Elevation:	60	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

If No stiffeners, Criteria:	TIA G	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.53	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	11.84	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.087	in	
Min PL "treq" for actual **T w/ Pry**:	0.388	in	
Min PL "t1" for actual **T w/o Pry**:	0.506	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	11.84	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	21.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	10.2	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	31.4%	**Pass**	Comp. Y.L. Length:
No Prying			18.25
Tension Side Stress Ratio, (treq/t)^2:	9.7%	**Pass**	

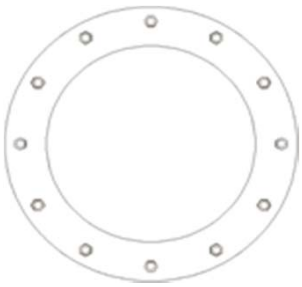
n/a

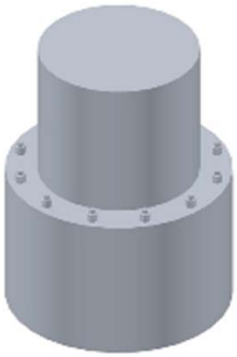
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Moment:	748.6	ft-kips
Axial:	62.279	kips
Shear:	33.838	kips
Exterior Flange Run, T+q:	11.84	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Elevation: 60 feet

Manufacturer:	Other

Bolt Data

Qty:	48		
Diam:	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	57	in	

Plate Data

Plate Outer Diam:	59.25	in
Plate Inner Diam:	54	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	3.88	in

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data

Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	11.8	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty),	54.5	Kips
Bolt Stress Ratio:	21.7%	**Pass**

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	14.4	Kips, Ext. Cu=Interior Cu
Plate Stress:	10.7	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	33.1%	**Pass**

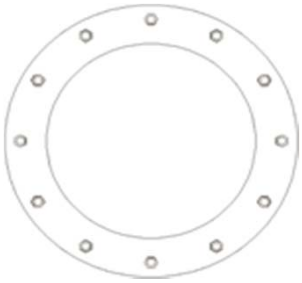
n/a

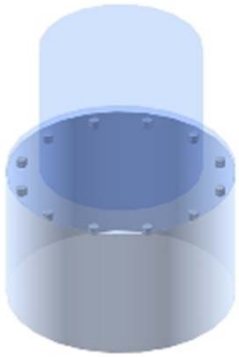
Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Existing Bridge Stiffeners @ 40'**				
DATE	**04/18/17**	PAGE	1	OF	1

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Determine Load to Bridge Stiffener:

M =	**3180.3 k-ft**	From Risa Model	**Stiffener Width**	**6.500 in**
I =	**60442.4 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	**31.125 in**		**Stiffener Height**	**179.000 in**
S =	1941.92 in^3	I/y	**Fy**	**65 ksi**
fc =	19.65 ksi	M/S	**Fu**	**80 ksi**
Ag =	8.125 in^2		**Step Width**	**.00 in**
Pu =	159.68 k	fc x Ag	**Bolt Circle**	**50.00 in**
			Number of Bolts	**64**
			Bolt Size	**1 1/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag		Eqn E3-1, AISC 13th Edition, Section E3.
K =	0.99	
l =	25.000 in	Unsupported Length
Iy =	1.058 in^4	Local Weak Axis Moment of Intertia
Ag =	8.125 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	68.59	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	60.84 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	41.56 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	337.70 k	Nominal Compressive Strength
ΦPn =	303.93 k	Allowable Compressive Strength

Unity% = 52.5 %

Tension Rupture Check: AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	8.125 in^2	Gross Area
An =	6.563 in^2	Net Area
Ae =	6.563 in^2	Effective Area
ΦRn =	475.31 k	Tension Yielding: Eqn J4-1
ΦRn =	393.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	393.75 ksi	

Unity% 40.55 %

Moment to Existing Bolt Group:

S_{BG} =	2417.70 in^3	# Bolts Acting	16
ft =	15.79 ksi		
Ab =	1.227 in^2		
T =	309.94 k		
Arm =	50.00 ksi		
M_{EQ} =	1291.4 k-ft	**<-------Insert into Flange Spreadsheet**	

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**New Bridge Stiffeners @ 40'**				
DATE	**04/18/17**	PAGE	1	OF	1

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Determine Load to Bridge Stiffener:

M =	**3180.3 k-ft**	From Risa Model	**Stiffener Width**	**6.000 in**
I =	**60442.4 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.000 in**
ybar =	**31.000 in**		**Stiffener Height**	**156.000 in**
S =	1949.75 in^3	I/y	**Fy**	**65 ksi**
fc =	19.57 ksi	M/S	**Fu**	**80 ksi**
Ag =	6.000 in^2		**Step Width**	**.00 in**
Pu =	117.44 k	fc x Ag	**Bolt Circle**	**50.00 in**
			Number of Bolts	**64**
			Bolt Size	**1 1/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag — Eqn E3-1, AISC 13th Edition, Section E3.

K =	0.99	
l =	16.000 in	Unsupported Length
Iy =	.500 in^4	Local Weak Axis Moment of Intertia
Ag =	6.000 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	54.87	

4.71 x √(E/Fy) = 99.49 — Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.

Fe =	95.06 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	48.82 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	292.94 k	Nominal Compressive Strength
ΦPn =	263.64 k	Allowable Compressive Strength

Unity% = 44.5 %

Tension Rupture Check: AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	6.000 in^2	Gross Area
An =	4.750 in^2	Net Area
Ae =	4.750 in^2	Effective Area
ΦRn =	351.00 k	Tension Yielding: Eqn J4-1
ΦRn =	285.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	285.00 ksi	

Unity% 41.21 %

Moment to Existing Bolt Group:

S_{BG} =	2417.70 in^3	# Bolts Acting	16
ft =	15.79 ksi		
Ab =	1.227 in^2		
T =	309.94 k		
Arm =	50.00 ksi		
M_{EQ} =	1291.4 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	722.91	ft-kips
Axial:	76.217	kips
Shear:	35.907	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 40-53BC feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	53	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	18.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	76.3	Kips
Bolt Stress Ratio:	23.7%	**Pass**

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	45	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	22.8	Kips, Ext. Cu=Interior Cu
Plate Stress:	11.9	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	36.9%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	6	in
Thick:	0.5	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

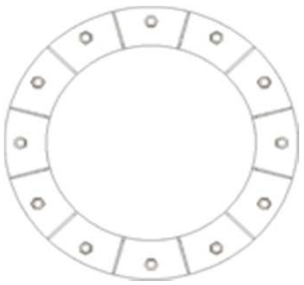
Stiffener Results

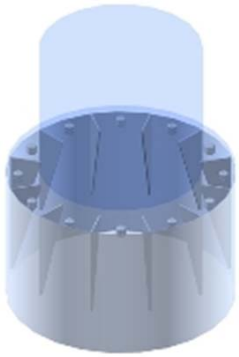
Horizontal Weld :	18.8%	**Pass**
Vertical Weld:	10.1%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	6.7%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	16.0%	**Pass**
Plate Comp. (AISC Bracket):	21.5%	**Pass**

Pole Results

Pole Punching Shear Check:	3.9%	**Pass**

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Moment:	568.49	ft-kips
Axial:	76.217	kips
Shear:	35.907	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Manufacturer:	Other

Elevation: 40-47BC feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	47	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	45	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	6	in
Thick:	0.5	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	15.8	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	76.3	Kips
Bolt Stress Ratio:	20.7%	**Pass**

Interior Flange Plate Results Flexural Check

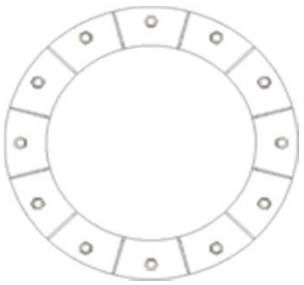
Controlling Bolt Axial Force:	20.5	Kips, Ext. Cu=Interior Cu
Plate Stress:	10.7	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	33.2%	**Pass**

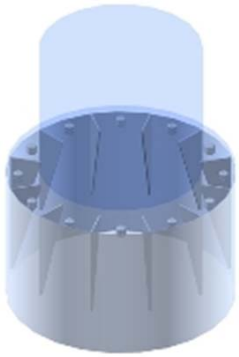
Stiffener Results

Horizontal Weld :	15.3%	**Pass**
Vertical Weld:	8.2%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	5.2%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	12.8%	**Pass**
Plate Comp. (AISC Bracket):	17.4%	**Pass**

Pole Results

Pole Punching Shear Check:	3.1%	**Pass**





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**Existing Bridge Stiffeners @ 20'**				
DATE	**04/18/17**	PAGE	1	OF	1

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Determine Load to Bridge Stiffener:

M =	**3925.0 k-ft**	From Risa Model	**Stiffener Width**	**6.500 in**
I =	**61968.8 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.250 in**
ybar =	**31.125 in**		**Stiffener Height**	**178.000 in**
S =	1990.96 in^3	I/y	**Fy**	**65 ksi**
fc =	23.66 ksi	M/S	**Fu**	**80 ksi**
Ag =	8.125 in^2		**Step Width**	**.00 in**
Pu =	192.21 k	fc x Ag	**Bolt Circle**	**50.00 in**
			Number of Bolts	**64**
			Bolt Size	**1 1/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag		Eqn E3-1, AISC 13th Edition, Section E3.
K =	0.99	
l =	24.000 in	Unsupported Length
Iy =	1.058 in^4	Local Weak Axis Moment of Intertia
Ag =	8.125 in^2	Stiffener Cross Sectional Area
ry =	.361 in	Radius of Gyration (Weak Axis)
kl/r =	65.85	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	66.02 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	43.05 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	349.75 k	Nominal Compressive Strength
ΦPn =	314.78 k	Allowable Compressive Strength

Unity% = 61.1 %

Tension Rupture Check: AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	8.125 in^2	Gross Area
An =	6.563 in^2	Net Area
Ae =	6.563 in^2	Effective Area
ΦRn =	475.31 k	Tension Yielding: Eqn J4-1
ΦRn =	393.75 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	393.75 ksi	

Unity% 48.82 %

Moment to Existing Bolt Group:

S_{BG} =	2478.75 in^3	# Bolts Acting	16
ft =	19.00 ksi		
Ab =	1.227 in^2		
T =	373.10 k		
Arm =	50.00 ksi		
M_{EQ} =	1554.6 k-ft	**<-------Insert into Flange Spreadsheet**	

PROJECT	**87581.015.01 - Newington_1, CT**				
SUBJECT	**New Bridge Stiffeners @ 20'**				
DATE	**04/18/17**	PAGE	1	OF	1

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Tulsa, OK 74159
(918) 587-4630

0

Determine Load to Bridge Stiffener:

M =	**3925.0 k-ft**	From Risa Model	**Stiffener Width**	**6.000 in**
I =	**61968.8 in^4**	From AutoCAD Sketch	**Stiffener Thickness**	**1.000 in**
ybar =	**31.000 in**		**Stiffener Height**	**156.000 in**
S =	1998.99 in^3	I/y	**Fy**	**65 ksi**
fc =	23.56 ksi	M/S	**Fu**	**80 ksi**
Ag =	6.000 in^2		**Step Width**	**.00 in**
Pu =	141.37 k	fc x Ag	**Bolt Circle**	**50.00 in**
			Number of Bolts	**64**
			Bolt Size	**1 1/4**
			Gap @ Flange	**6.00 in**

Determine ΦPn (Allowable Axial Load):

Pn = Fcr x Ag		Eqn E3-1, AISC 13th Edition, Section E3.
K =	0.99	
l =	16.000 in	Unsupported Length
Iy =	.500 in^4	Local Weak Axis Moment of Intertia
Ag =	6.000 in^2	Stiffener Cross Sectional Area
ry =	.289 in	Radius of Gyration (Weak Axis)
kl/r =	54.87	
4.71 x √(E/Fy) =	99.49	Limit State Equation for Flexural Buckling - AISC 13th Edition, Section E3.
Fe =	95.06 ksi	Eqn E3-4 - AISC 13th Edition, Section E3. Elastic Critical Buckling Stress
Fcr =	48.82 ksi	Eqn E3-2, AISC 13th Edition, Section E3 Critical Buckling Stress
Pn =	292.94 k	Nominal Compressive Strength
ΦPn =	263.64 k	Allowable Compressive Strength

Unity% = 53.6 %

Tension Rupture Check:

AISC 13th Edition, Chapter J4.1

Hole Size	1.25	
U =	1	Shear Lag Factor - Table D3.1 and TIA222-G
Ag =	6.000 in^2	Gross Area
An =	4.750 in^2	Net Area
Ae =	4.750 in^2	Effective Area
ΦRn =	351.00 k	Tension Yielding: Eqn J4-1
ΦRn =	285.00 k	Tension Rupture: Eqn J4-2
ΦRn(Equiv)	285.00 ksi	

Unity% 49.60 %

Moment to Existing Bolt Group:

S_{BG} =	2478.75 in^3	# Bolts Acting	16
ft =	19.00 ksi		
Ab =	1.227 in^2		
T =	373.10 k		
Arm =	50.00 ksi		
M_{EQ} =	1554.6 k-ft	**<-------Insert into Flange Spreadsheet**	

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Manufacturer:	Other

Reactions		
Moment:	870.24	ft-kips
Axial:	90.896	kips
Shear:	37.519	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20-53BC feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	53	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	21.8	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	76.3	Kips
Bolt Stress Ratio:	28.6%	**Pass**

Plate Data		
Plate Outer Diam:	58.75	in
Plate Inner Diam:	45	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	27.5	Kips, Ext. Cu=Interior Cu
Plate Stress:	14.4	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	44.3%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	6	in
Thick:	0.5	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

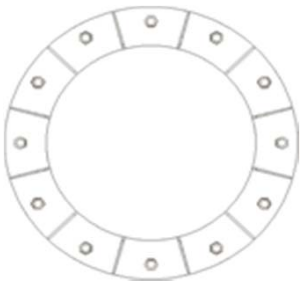
Stiffener Results

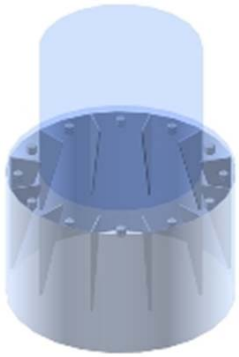
Horizontal Weld :	19.2%	**Pass**
Vertical Weld:	10.3%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	6.8%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	16.4%	**Pass**
Plate Comp. (AISC Bracket):	21.9%	**Pass**

Pole Results

Pole Punching Shear Check:	3.2%	**Pass**

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *826217*
Site Name: *Newington ,CT*
App #: *386362 Revision # 0*

Reactions		
Moment:	684.36	ft-kips
Axial:	90.896	kips
Shear:	37.519	kips
Exterior Flange Run, T+q:	0	kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
53.15

Elevation: 20-47BC feet

Manufacturer:	Other

Bolt Data

Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	19.0	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	76.3	Kips
Bolt Stress Ratio:	24.9%	**Pass**

Plate Data

Plate Outer Diam:	58.75	in
Plate Inner Diam:	45	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.77	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	24.7	Kips, Ext. Cu=Interior Cu
Plate Stress:	12.9	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	39.9%	**Pass**

Stiffener Data (Welding at Both Sides)

Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	6	in
Thick:	0.5	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Stiffener Results

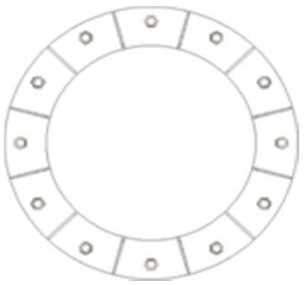
Horizontal Weld :	15.6%	**Pass**
Vertical Weld:	8.3%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	5.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	13.1%	**Pass**
Plate Comp. (AISC Bracket):	17.8%	**Pass**

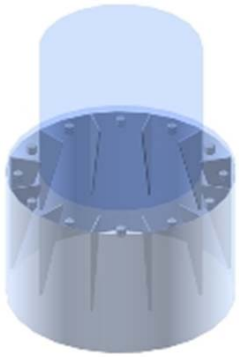
Pole Results

Pole Punching Shear Check:	2.6%	**Pass**

Pole Data

Pole OuterDiam:	60	in
Thick:	0.625	in
Pole Inner Diam:	58.75	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	826217
Name:	Newington_1
App. #:	386362 Revision # 0

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	4691	ft-kip
Axial:	106	kip
Shear:	39	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	G
ASIF:	1.000
Failure:	105%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	52	
Diameter:	1.25	in
Material:	A687	
Bolt Circle:	67.0	in
Bolt Spacing:		in
Bolt Group Area:	63.81	in^2
Bolt Group MOIx:	35807	in^4

Reactions Seen by Original AR Group		
Moment:	2149.2	kip-ft
Axial:	105.7	kip
Shear:	38.7	kip

Original AR Capacity Check		
Combined Load:	33.1	kip
Allowable load:	116.3	kip
AR Capacity:	28.5%	Pass

First Added Anchor Rod Data		
Quantity:	10	
Diameter:	2.25	in
Material:	A687	
Bolt Circle:	92.3	in
Bolt Group Area:	39.76	in^2
Bolt Group MOIx:	42342	in^4

Reactions Seen by First Added AR Group		
Moment:	2541.5	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Combined Load:	132.2	kip
Allowable load:	389.7	kip
AR Capacity:	33.9%	Pass

Second Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Combined Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Materi

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(F

Site Data

BU#:	*826217*
Site Name:	*Newington_1*
App #:	*386362 Revision # 0*
Pole Manufacturer:	*Other*

Reactions		
Mu:	2149.2473	ft-kips
Axial, Pu:	105.6746	kips
Shear, Vu:	38.666213	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria:	AISC LRFD	<-Only Applcable to Unstiffene

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	33.1	Kips
Allowable Axial, Φ*Fu*Anet:	116.3	Kips
Anchor Rod Stress Ratio:	28.5%	**Pass**

Plate Data		
Diam:	70	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Base Plate Results Shear Check Only

Base Plate Stress:	4.2	ksi
Allowable Plate Stress:	19.4	ksi
Base Plate Stress Ratio:	21.7%	**Pass**

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.3125	in
Fillet V. Weld:	0.3125	in
Width:	3	in
Height:	6	in
Thick:	0.5	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

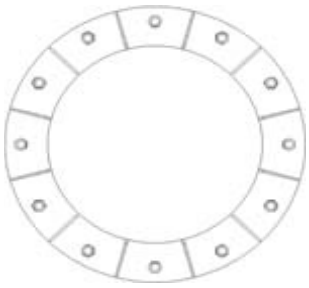
Stiffener Results

Horizontal Weld :	40.4%	**Pass**
Vertical Weld:	21.6%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	17.4%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	37.1%	**Pass**
Plate Comp. (AISC Bracket):	46.0%	**Pass**

Pole Data		
Diam:	60	in
Thick:	0.625	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	57	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check:	6.6%	**Pass**



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PROJECT	**826217 - Newington_1, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**04/18/17**	PAGE	1	OF	1

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Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

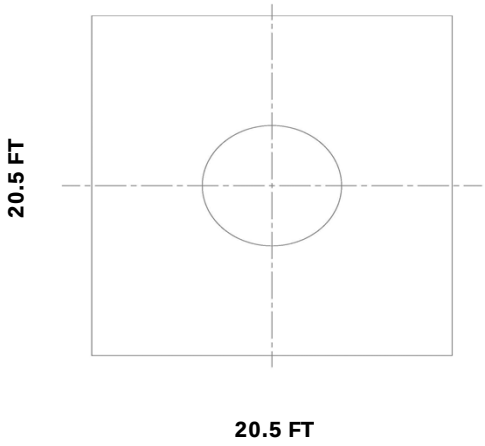
Rev. Type: G

Design Loads:

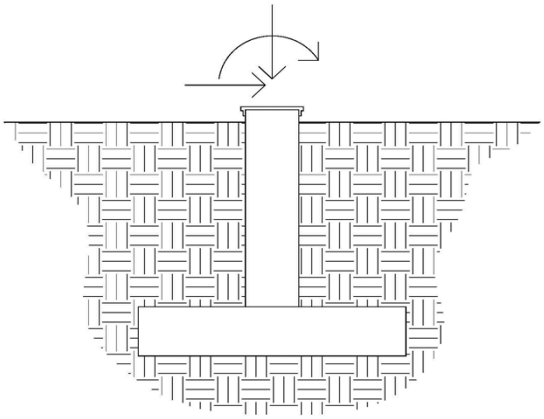
	Input factored loads	
Shear:	39.0	kips
Moment:	3,491.0	ft-kips
Tower Height:	190.0	ft
Tower Weight:	106.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	60.00	in
Bearing Depth:	9.0	ft
Pad Width:	20.5	ft
Neglected Depth:	3.3	ft
Thickness:	2.5	ft
Pier Diameter:	7.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	3.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	9	
Pier Rebar Quanity:	34	
Pad Rebar Size:	11	
Pad Rebar Quanity:	30	
Pier Tie Size:	4	
Tie Quanity:	11	
Rebar Yield Strength:	60000	psi
Concrete Strength:	4000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.130	kcf
Ult. Bearing Capacity:	16.000	ksf
Angle of Friction:	36.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.350	

** Notes:

***Rock anchor capcity is 1200 k-ft**
***Moment reduced to account for modification**

Summary of Results

Req'd Pier Diam.	OK
Overturning	56.3%
Shear Capacity	18.2%
Bearing	35.5%
Pad Shear - 1-way	63.1%
Pad Shear - 2-way	9.3%
Pad Moment Capacity	22.2%
Pier Moment Capacity	65.6%

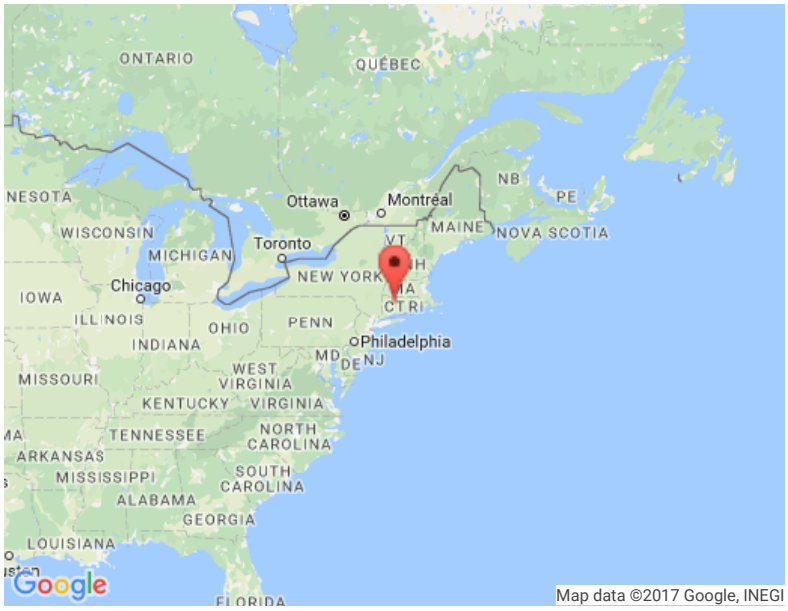
Search Results

Query Date: Thu Apr 13 2017
Latitude: 41.6262
Longitude: -72.7756

ASCE 7-10 Windspeeds (3-sec peak gust in mph*):

Risk Category I: 112
Risk Category II: 123
Risk Category III-IV: 132
MRI 10-Year:** 76
MRI 25-Year:** 87
MRI 50-Year:** 93
MRI 100-Year:** 99

ASCE 7-05 Windspeed:
101 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
80 (fastest mile in mph)



*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

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