10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 28, 2019

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
Rocky Hill Road, Trumbull, CT 06611
Latitude: 41.2315990000
Longitude: -73.190005000
T-Mobile Site#: CT11080B – L700 CMP4

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 164-foot level and the 156-foot level of the existing 150-foot transmission tower at Rocky Hill Road, Trumbull, CT. The 150-foot transmission tower is owned and operated by Eversource Energy. The property is owned by Par Old Town LLC. T-Mobile now intends to replace the six (6) of its existing antennas with six (6) new 600/700/1900/2100 MHz antennas. The new antennas will be installed at the 160-foot level of the tower. The existing antenna pipe masts will also be replaced by a new antenna pipe masts to accommodate the new equipment.

Planned Modifications:
Tower:
Remove
N/A

Remove and Replace:
(3) APXV18-206516S (Remove) – (3) APX16DWV-16DWVS-E-A20 Antenna (Replace) 1900/2100 MHz
(3) APXV18-206516S (Remove) – (3) APXVAARR24_43-U-NA20 Antenna (Replace) 600/700 MHz
7/8" flange bolts (Remove) – 1" flange bolts (Replace)

Install New:
(12) 1-1/4" coax cables
Ring Mount / Triple T-Arm Kit

Existing to Remain:
(12) 1-1/4" coax cables

Ground:

Install New: Equipment rack with:

- (3) Remote Radio Heads
- (6) TMA
- (6) Diplexers

This facility was initially approved by the CSC in Petition No. 400 dated July 23, 1998. The CSC subsequently approved further modifications to the facility in Petition No. 915 dated September 17, 2009. This modification complies with this approval. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -Vicki Tesoro, Elected Official, and Douglas Wenz, Zoning Enforcement Officer for the Town of Trumbull, as well as the property owner and tower 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 modifications 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 modifications 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
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Vicki Tesoro – Town of Trumbull First Selectmen
Douglas Wenz– Town of Trumbull Zoning Enforcement Officer
Eversource Energy – tower owner
Par Old Town LLC- property owner

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, June 28, 2019 12:06 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11080B CSC EO

You have a package coming.

Scheduled Delivery Date: Monday, 07/01/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424291758066
Ship To:	Vicki A. Tesoro Town of Trumbull 5866 Main St. 2nd Floor TRUMBULL, CT 066113113 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/01/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11080B CSC EO

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, June 28, 2019 12:09 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11080B CSC ZO

You have a package coming.

Scheduled Delivery Date: Monday, 07/01/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424294988071
Ship To:	Douglas Wenz Town of Trumbull 5866 Main Street Second Floor TRUMBULL, CT 066113113 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/01/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11080B CSC ZO

Download the UPS mobile app

Kyle Richers

From:	UPS Quantum View <pkginfo@ups.com>
Sent:	Friday, June 28, 2019 12:10 PM
To:	krichers@transcendwireless.com
Subject:	UPS Ship Notification, Reference Number 1: CT11080B CSC TO

You have a package coming.

Scheduled Delivery Date: Monday, 07/01/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424290222083
Ship To:	Chris Gelinas Eversource Energy 107 Selden Street BERLIN, CT 060371616 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/01/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11080B CSC TO

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Friday, June 28, 2019 12:12 PM
To: krichers@transcendwireless.com
Subject: UPS Ship Notification, Reference Number 1: CT11080B CSC PO

You have a package coming.

Scheduled Delivery Date: Monday, 07/01/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

Shipment Details

From:	TRANSCEND WIRELESS
Tracking Number:	1ZV257424294060090
Ship To:	Par Old Town LLC 45 Knollwood Road Suite 305 ELMSFORD, NY 105232833 US
UPS Service:	UPS GROUND
Number of Packages:	1
Scheduled Delivery:	07/01/2019
Signature Required:	A signature is required for package delivery
Weight:	1.0 LBS
Reference Number 1:	CT11080B CSC PO

Download the UPS mobile app

900 OLD TOWN ROAD

Location 900 OLD TOWN ROAD

Mblu H/11 / 00166/ 000/

Acct#

Owner PAR OLD TOWN LLC

Assessment $44,178,260

Appraisal $63,111,800

PID 406

Building Count 12

Fire District T

Current Value

Appraisal	
Valuation Year	**Total**
2015	$63,111,800

Assessment	
Valuation Year	**Total**
2015	$44,178,260

Owner of Record

Owner PAR OLD TOWN LLC
Co-Owner C/O PAREDIM PARTNERS
Address 45 KNOLLWOOD RD STE 305
ELMSFORD, NY 10523

Sale Price $70,250,000
Book & Page 1709/ 123
Sale Date 03/01/2016
Instrument

Ownership History

Ownership History				
Owner	**Sale Price**	**Book & Page**	**Instrument**	**Sale Date**
PAR OLD TOWN LLC	$70,250,000	1709/ 123		03/01/2016
GATES FINANCING LLC	$10	1491/ 7	04	04/27/2009
AVALON PROPERTIES INC	$0	845/ 742		07/07/1994

Building Information

Building 1 : Section 1

Year Built: 1994
Living Area: 25,774

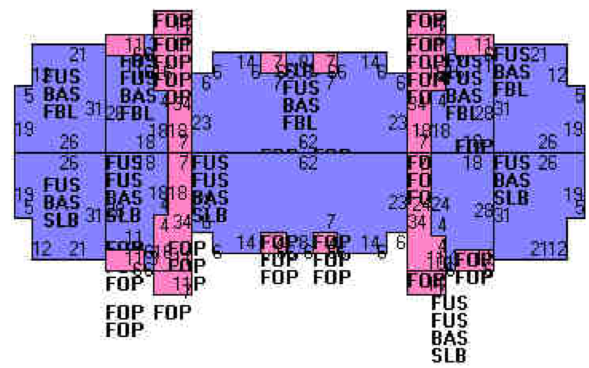
Building Attributes	
Field	**Description**

STYLE	Apartment Bldg
Stories:	3 Stories
Occupancy	24
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Linoleum
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/TrumbullCTPhotos//\00\00\13/

Building Layout



(http://images.vgsi.com/photos2/TrumbullCTPhotos//Sketches/4

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	13,456	13,456
BAS	First Floor	8,220	8,220
FBL	Fin Bsmt Living Area	4,098	4,098
FOP	Open Porch	5,646	0
SLB	Slab	4,122	0
		35,542	25,774

Building 2 : Section 1

Year Built: 1996
Living Area: 28,953

Building Attributes : Bldg 2 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	23
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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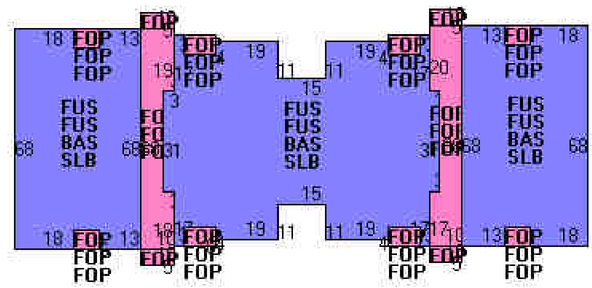
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	19,302	19,302
BAS	First Floor	9,651	9,651
FOP	Open Porch	5,018	0
SLB	Slab	9,651	0
		43,622	28,953

Building 3 : Section 1

Year Built: 1996
Living Area: 33,420

Building Attributes : Bldg 3 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories
Occupancy	36

Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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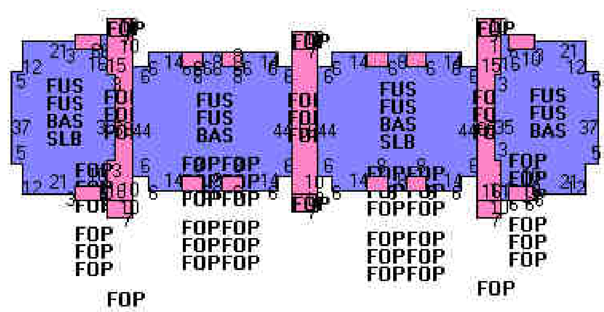
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	22,280	22,280
BAS	First Floor	11,140	11,140
FOP	Open Porch	7,362	0
SLB	Slab	5,570	0
		46,352	33,420

Building 4 : Section 1

Year Built: 1997
Living Area: 34,190

Building Attributes : Bldg 4 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories
Occupancy	42

Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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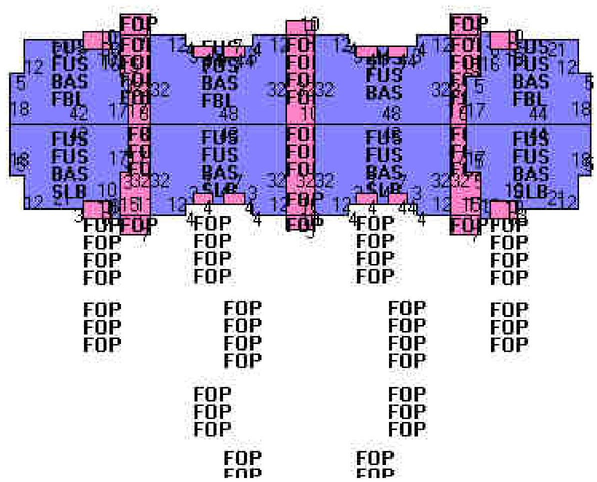
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	20,328	20,328
BAS	First Floor	10,164	10,164
FBL	Fin Bsmt Living Area	3,698	3,698
FOP	Open Porch	8,248	0
SLB	Slab	5,082	0
		47,520	34,190

Building 5 : Section 1

Year Built: 1997
Living Area: 28,953

Building Attributes : Bldg 5 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	24
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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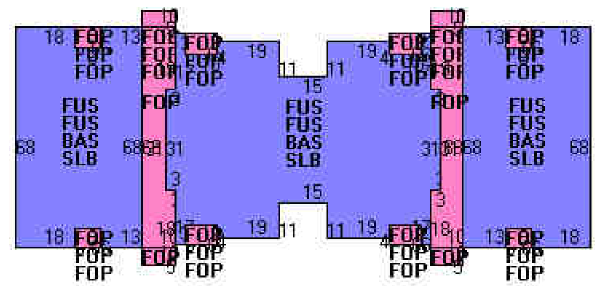
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
FUS	Finished Upper Story	19,302	19,302
BAS	First Floor	9,651	9,651
FOP	Open Porch	5,018	0
SLB	Slab	9,651	0
		43,622	28,953

Building 6 : Section 1

Year Built: 1997
Living Area: 35,574

Building Attributes : Bldg 6 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories
Occupancy	42

Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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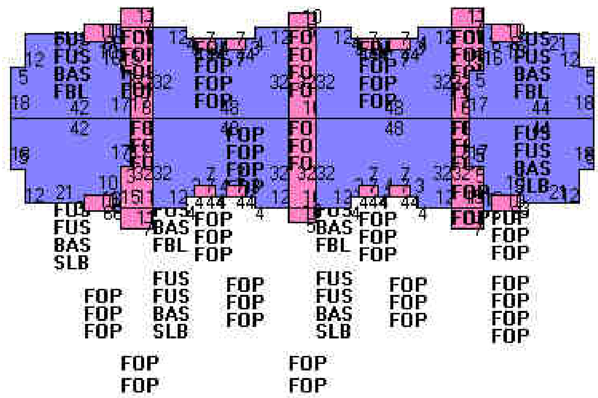
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	20,328	20,328
BAS	First Floor	10,164	10,164
FBL	Fin Bsmt Living Area	5,082	5,082
FOP	Open Porch	8,248	0
SLB	Slab	5,082	0
		48,904	35,574

Building 7 : Section 1

Year Built: 1997
Living Area: 31,325

Building Attributes : Bldg 7 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	28
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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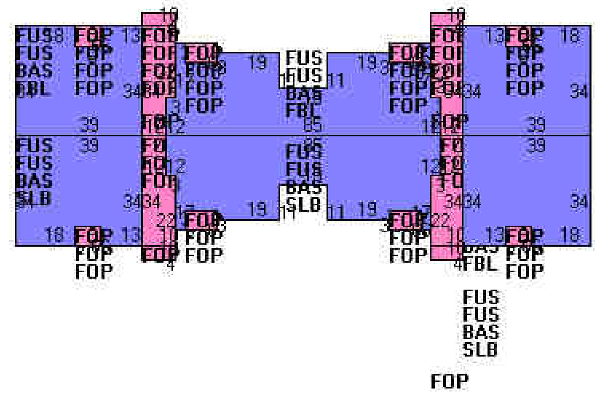
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	17,900	17,900
BAS	First Floor	8,950	8,950
FBL	Fin Bsmt Living Area	4,475	4,475
FOP	Open Porch	5,928	0
SLB	Slab	4,475	0
		41,728	31,325

Building 8 : Section 1

Year Built: 1997
Living Area: 31,549

Building Attributes : Bldg 8 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	28
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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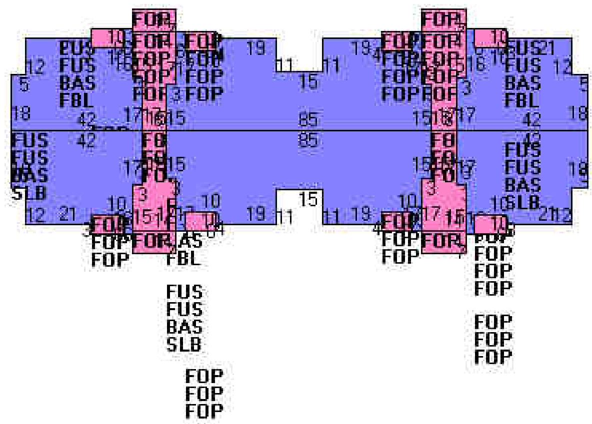
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	18,028	18,028
BAS	First Floor	9,014	9,014
FBL	Fin Bsmt Living Area	4,507	4,507
FOP	Open Porch	7,000	0
SLB	Slab	4,507	0
		43,056	31,549

Building 9 : Section 1

Year Built: 1997
Living Area: 38,934

Building Attributes : Bldg 9 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	42
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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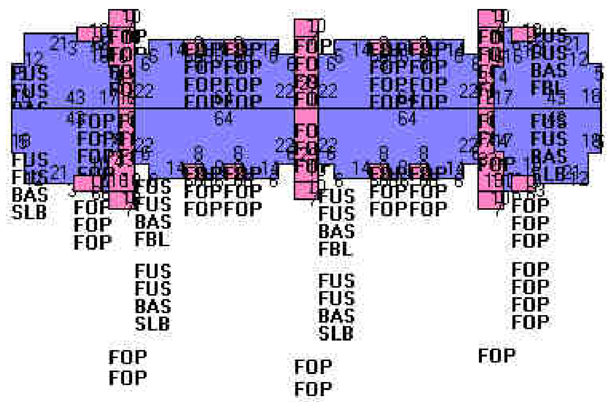
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	22,248	22,248
BAS	First Floor	11,124	11,124
FBL	Fin Bsmt Living Area	5,562	5,562
FOP	Open Porch	8,058	0
SLB	Slab	5,562	0
		52,554	38,934

Building 10 : Section 1

Year Built: 1997
Living Area: 30,409

Building Attributes : Bldg 10 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	27
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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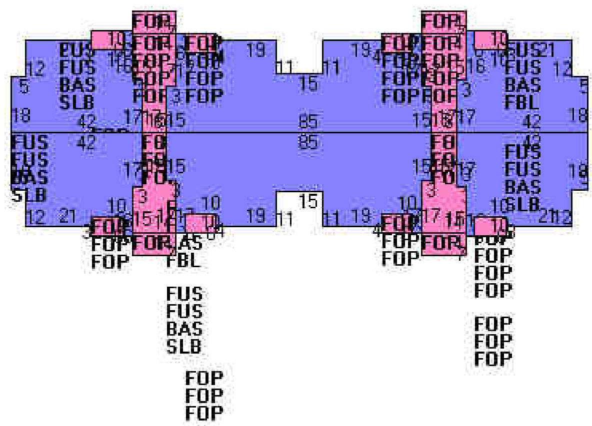
Building Layout



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Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	18,028	18,028
BAS	First Floor	9,014	9,014
FBL	Fin Bsmt Living Area	3,367	3,367
FOP	Open Porch	7,000	0
SLB	Slab	5,647	0
		43,056	30,409

Building 11 : Section 1

Year Built: 1997
Living Area: 28,953

Building Attributes : Bldg 11 of 12	
Field	**Description**
STYLE	Apartment Bldg
Stories:	3 Stories

Occupancy	24
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	8
% Comn Wall	

Building Photo

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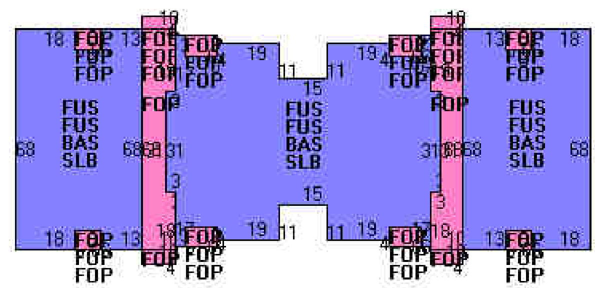
Building Layout



(http://images.vgsi.com/photos2/TrumbullCTPhotos//Sketches/40

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
FUS	Finished Upper Story	19,302	19,302
BAS	First Floor	9,651	9,651
FOP	Open Porch	4,978	0
SLB	Slab	9,651	0
		43,582	28,953

Building 12 : Section 1

Year Built: 1994
Living Area: 7,701

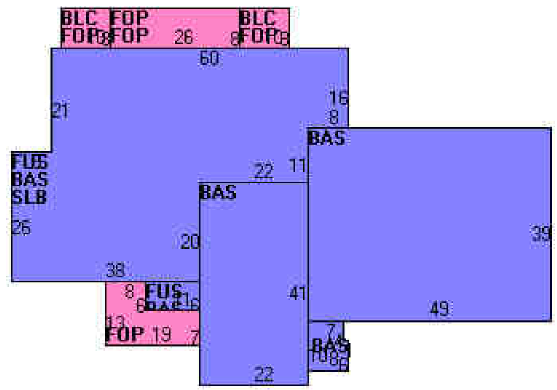
Building Attributes : Bldg 12 of 12	
Field	**Description**
STYLE	Office Bldg
Stories:	2 Stories
Occupancy	1

Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Vinyl
Heating Fuel	Gas
Heating Type	Forced Air
AC Type	Central
Bldg Use	Apartments
1st Floor Use:	
Heat/AC	Heat/AC Pkgs
Frame Type	Wood Frame
Baths/Plumbing	Average
Ceiling/Walls	Ceil & Walls
Rooms/Prtns	Above Average
Wall Height	12
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/TrumbullCTPhotos//\00\01\33/

Building Layout



(http://images.vgsi.com/photos2/TrumbullCTPhotos//Sketches/4

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	5,295	5,295
FUS	Finished Upper Story	2,406	2,406
BLC	Balcony	160	0
FOP	Open Porch	757	0
SLB	Slab	2,340	0
		10,958	7,701

Extra Features

Extra Features			Legend
Code	**Description**	**Size**	**Bldg #**
SPR	Sprinklers	28953 S.F.	2
SPR	Sprinklers	31325 S.F.	7
SPR	Sprinklers	34190 S.F.	4

SPR	Sprinklers	25774 S.F.	1
SPR	Sprinklers	35574 S.F.	6
SPR	Sprinklers	28593 S.F.	5
SPR	Sprinklers	28953 S.F.	11
SPR	Sprinklers	31549 S.F.	8
SPR	Sprinklers	7701 S.F.	12
SPR	Sprinklers	30409 S.F.	10
SPR	Sprinklers	33420 S.F.	3
SPR	Sprinklers	38934 S.F.	9

Land

Land Use

Use Code 112
Description Apartments
Zone
Neighborhood 625
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 38.62
Frontage
Depth

Outbuildings

Outbuildings					Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Bldg #**
FCP	Carport			3800 S.F.	9
FGR1	Garage	FR	Frame	2541 S.F.	5
FGR1	Garage	FR	Frame	2541 S.F.	11
FGR1	Garage	FR	Frame	924 S.F.	8
FGR1	Garage	FR	Frame	924 S.F.	10
FGR1	Garage	FR	Frame	966 S.F.	3
LT1	Light - 1			6 Units	6
LT1	Light - 1			8 Units	1
PAV2	Paving Concrt			2000 S.F.	12
CNP	Canopy			690 S.F.	5
CNP	Canopy			690 S.F.	11
FCP	Carport			1520 S.F.	8
FCP	Carport			1520 S.F.	9
FCP	Carport			1520 S.F.	10
FCP	Carport			3116 S.F.	3
LT1	Light - 1			6 Units	2
LT1	Light - 1			6 Units	7
LT1	Light - 1			8 Units	4
SPL4	Pool AG Rect.			2160 S.F.	12

FCP	Carport			1140 S.F.	8
FCP	Carport			1140 S.F.	10
FCP	Carport			1520 S.F.	9
GAZ1	Gazebo			150 S.F.	3
KSK1	Kiosk - Retail			64 S.F.	12
FCP	Carport			1140 S.F.	9
FGR1	Garage	FR	Frame	2373 S.F.	3
LT1	Light - 1			7 Units	5
LT1	Light - 1			8 Units	10
LT1	Light - 1			8 Units	11
CNP	Canopy			240 S.F.	9
LT1	Light - 1			4 Units	8
LT1	Light - 1			5 Units	12
LT1	Light - 1			6 Units	3
PAV1	Paving Asph.			204000 S.F.	9
LT1	Light - 1			7 Units	9

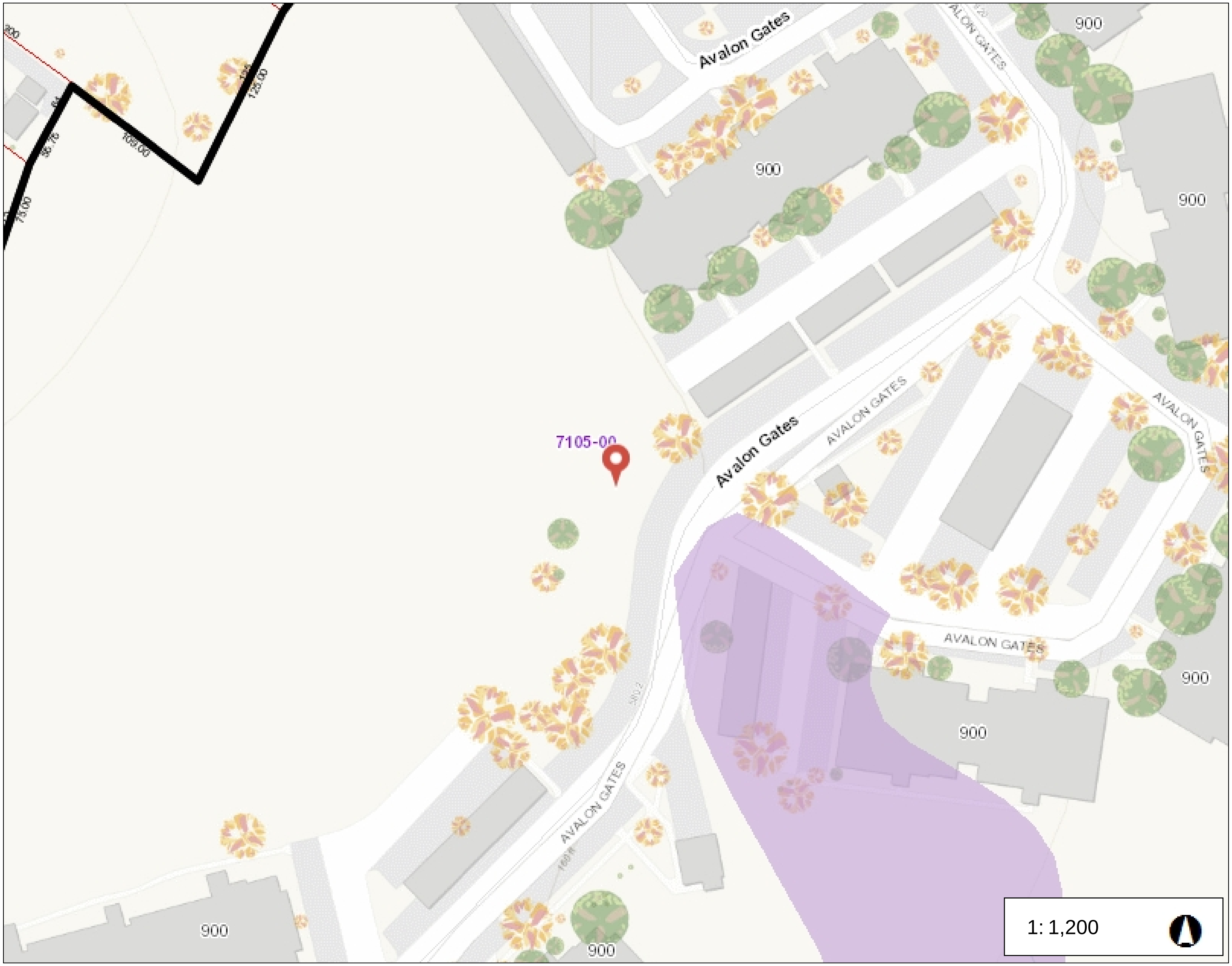
Valuation History

Appraisal	
Valuation Year	**Total**
2017	$63,111,800
2016	$63,111,800
2015	$63,111,800

Assessment	
Valuation Year	**Total**
2017	$44,178,260
2016	$44,178,260
2015	$44,178,260

Town of Trumbull

Map Title



Legend

Streetname

Roadways

- Local
- Collector
- Minor Collector
- Minor Arterial
- Major Collector
- PA Other
- PA Other Expwy
- PA Interstate

Inland Wetland Soils

- Poorly Drained and Very Poorly Dra
- Alluvial and Floodplain Soils

Local Basin Boundary

- Major
- Regional
- Subregional
- Local

Local Basin Area

Citations

200.0 0 100.00 200.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

METROCOG Connecticut Metropolitan Council of Governments

Petition No. 915
Staff Report
T-Mobile USA, Inc.
Rocky Hill Road, Trumbull
September 17, 2009

On September 1, 2009, the Connecticut Siting Council (Council) received a Petition (Petition) from Omnipoint Communications Inc., a subsidiary of T-Mobile USA, Inc. (T-Mobile) for a Declaratory Ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to an existing 150-foot 115-kV electric transmission structure owned by the Connecticut Light and Power Company (CL&P).

Currently, T-Mobile has three panel antennas installed at the 156-foot level of the structure. The total height with appurtenances is approximately 158 feet. As part of its UMTS upgrade, T-Mobile would require three additional panel antennas. Since only three antennas can be flush-mounted at one level, T-Mobile seeks to install the three new antennas at a new height: the 164-foot level of the structure. This would require an approximately eight-foot pipe extension which would increase the total height with appurtenances to about 166-foot 2 inches. To be conservative, T-Mobile rounds the total height to a worst-case of 168 feet. T-Mobile would also install a RBS 3106 equipment cabinet on a new 5-foot 6-inch by 10-foot concrete pad at the base of the tower.

The structure is located in a CL&P right-of-way just southeast of Route 25. On the other three sides are residential properties. The closest property is approximately 150 feet southwest of the structure. The visual impact of the structure modification from this or other nearby properties is not expected to significantly increase because of the compact flush-mounted antenna configuration. In addition, the top of the tower is more difficult to see at close distances. The proposed equipment cabinet would not be located on the side of the structure facing the nearest residence. It would be located on the opposite site which would reduce its visibility.

The applicant submitted notice to abutting property owners on or about the time of filing with the Council. The due date for replies was Friday, September 11, 2009. No replies have been received. The underlying property owner (Town of Trumbull), and the electric transmission company (CL&P) were both provided notice on or about the time of filing.

This Petition was field reviewed by Council member Dr. Barbara C. Bell and Michael Perrone of the Council staff on September 9, 2009. Attorney Carrie L. Larson from Pullman and Comley LLC, and Tom F. Flynn from Maxton Technology, Inc. (both representing T-Mobile) and Fred Bietsch, Zoning Enforcement Officer from the Town of Trumbull also attended the field review.

At the field review, overgrown vegetation was found around T-Mobile's existing equipment cabinet. If approved, staff suggests including a condition that overgrown vegetation surrounding T-Mobile's equipment be removed.

WIRELESS COMMUNICATIONS FACILITY

CL&P AT MP
SITE ID: CT11080B
EVERSOURCE STRUCT 845
ROCKY HILL ROAD
TRUMBULL, CT 06611

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2018 CONNECTICUT FIRE SAFETY CODE AND, 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

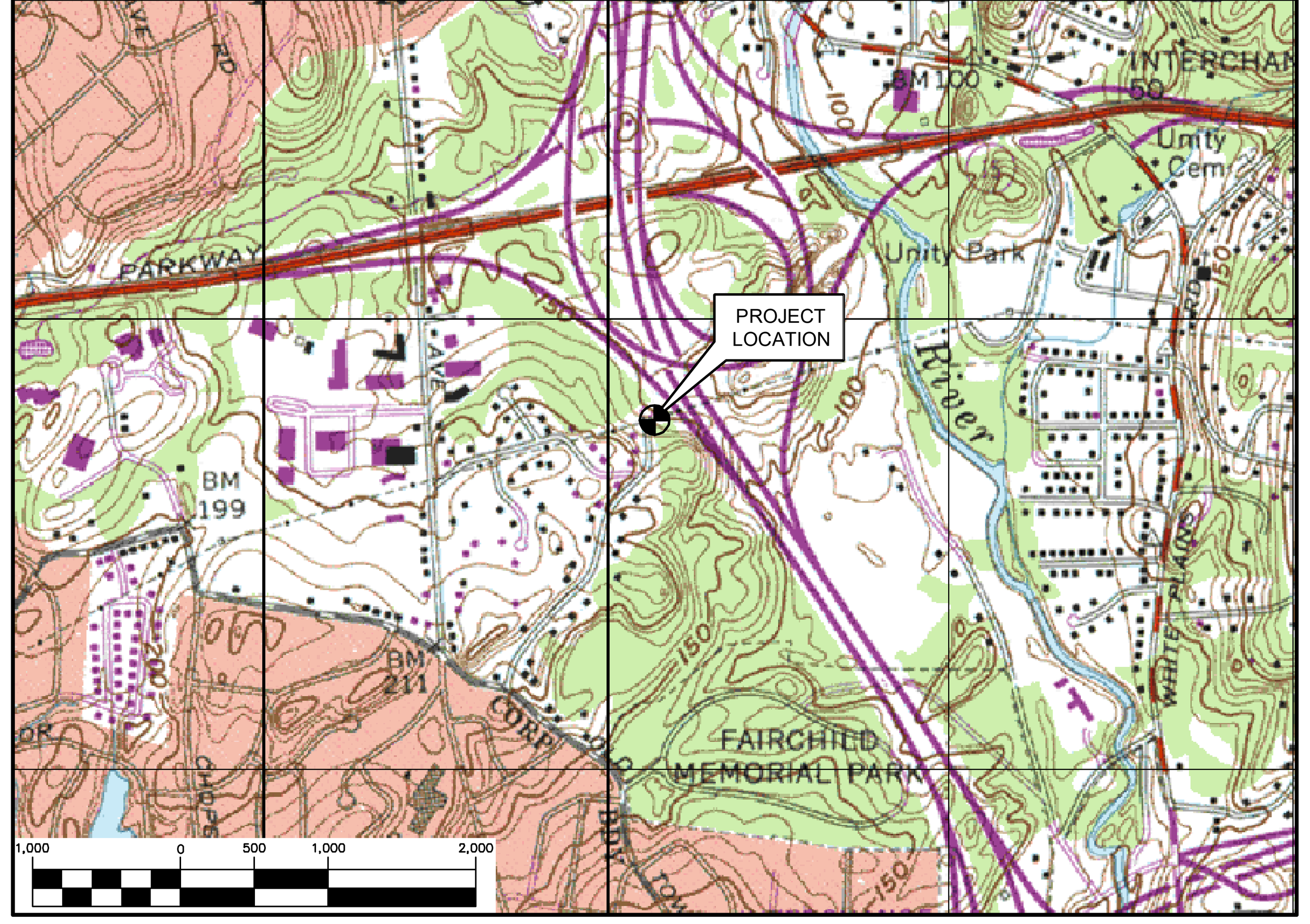
TO: ROCKY HILL ROAD (POLE 845)
TRUMBULL, CT 06611

1.	START OUT GOING NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD.	0.36 MI.
2.	TURN LEFT ONTO CAPITAL BLVD.	0.27 MI.
3.	TURN LEFT ONTO WEST ST.	0.30 MI.
4.	MERGE ONTO I-91 S VIA THE RAMP ON THE LEFT TOWARD NEW HAVEN.	9.59 MI.
5.	MERGE ONTO CT-15 S VIA EXIT 17 TOWARD E MAIN ST.	31.95 MI.
6.	TAKE THE CT-127 EXIT, EXIT 50, TOWARD TRUMBULL.	0.19 MI.
7.	TURN RIGHT ONTO WHITE PLAINS RD/CT-127.	0.92 MI.
8.	TURN LEFT ONTO RESERVOIR AVE.	0.95 MI.
9.	TURN LEFT ONTO ROCKY HILL TER.	0.30 MI.
10.	TURN LEFT ONTO ROCKY HILL RD.	0.10 MI.
11.	ROCKY HILL RD, TRUMBULL, CT 06611-4831, 81 ROCKY HILL RD IS ON THE LEFT.	0.02 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



T-MOBILE RF CONFIGURATION

67D94B_1DP+1QP+1OP

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 PIPE MAST FOR A NEW 12 SCH 80 PIPE MAST X 26' LONG.
   - B. REMOVE (6) EXISTING T-MOBILE ANTENNAS, FOR (6) NEW T-MOBILE ANTENNAS.
   - C. INSTALL (12) NEW 1-1/4" ø COAX CABLES ON EXTERIOR OF POLE.
   - D. INSTALL (1) NEW EQUIPMENT RACK AT GRADE
   - E. INSTALL (3) NEW RRU'S (RADIO REMOTE UNITS) AT GRADE
   - F. INSTALL (6) NEW TMA'S AT GRADE
   - G. INSTALL (6) NEW DIPLEXERS AT GRADE

PROJECT INFORMATION

SITE NAME:	CL&P AT MP
SITE ID:	CT11080B
SITE ADDRESS:	ROCKY HILL ROAD (POLE 845) TRUMBULL, CT 06611
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592-8291
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-13'-53.75" N LONGITUDE: 73°-11'-24.25" W GROUND ELEVATION: 164'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	DESIGN BASIS AND SITE NOTES	1
C-1	SITE LOCATION PLAN	1
C-2	COMPOUND PLAN AND ELEVATION	1
C-3	ANTENNA CONFIGURATION AND FEEDLINE PLAN	1
C-4	TYPICAL DETAILS	1
S-1	MAST REPLACEMENT DETAILS	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	6/20/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	4/09/19	TJL	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
CL&P AT MP
SITE ID: CT11080B
ROCKY HILL ROAD (POLE 845)
TRUMBULL, CT 06611

DATE:	3/7/19
SCALE:	AS NOTED
JOB NO.	18058.43

TITLE SHEET

T-1

Sheet No. 1 of 7

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

ANTENNA MAST

- WIND LOAD: PER ANSI/TIA 222 G (ANTENNA MOUNTS): 97 MPH

TRANSMISSION TOWER – WIRE LOADS

- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
- WIND LOAD: PER HISTORIC 1977 NESC 250C – 20PSF

TRANSMISSION TOWER – TOWER AND TELECOMMUNICATIONS EQUIPMENT

- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250B – 4PSF
- WIND LOAD: PER NESC C2–2012 SECTION 25 RULE 250C – 110MPH
- 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.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	6/20/19	TJL	CAG	ISSUED FOR CONSTRUCTION
0	4/09/19	TJL	CAG	ISSUED FOR CONSTRUCTION

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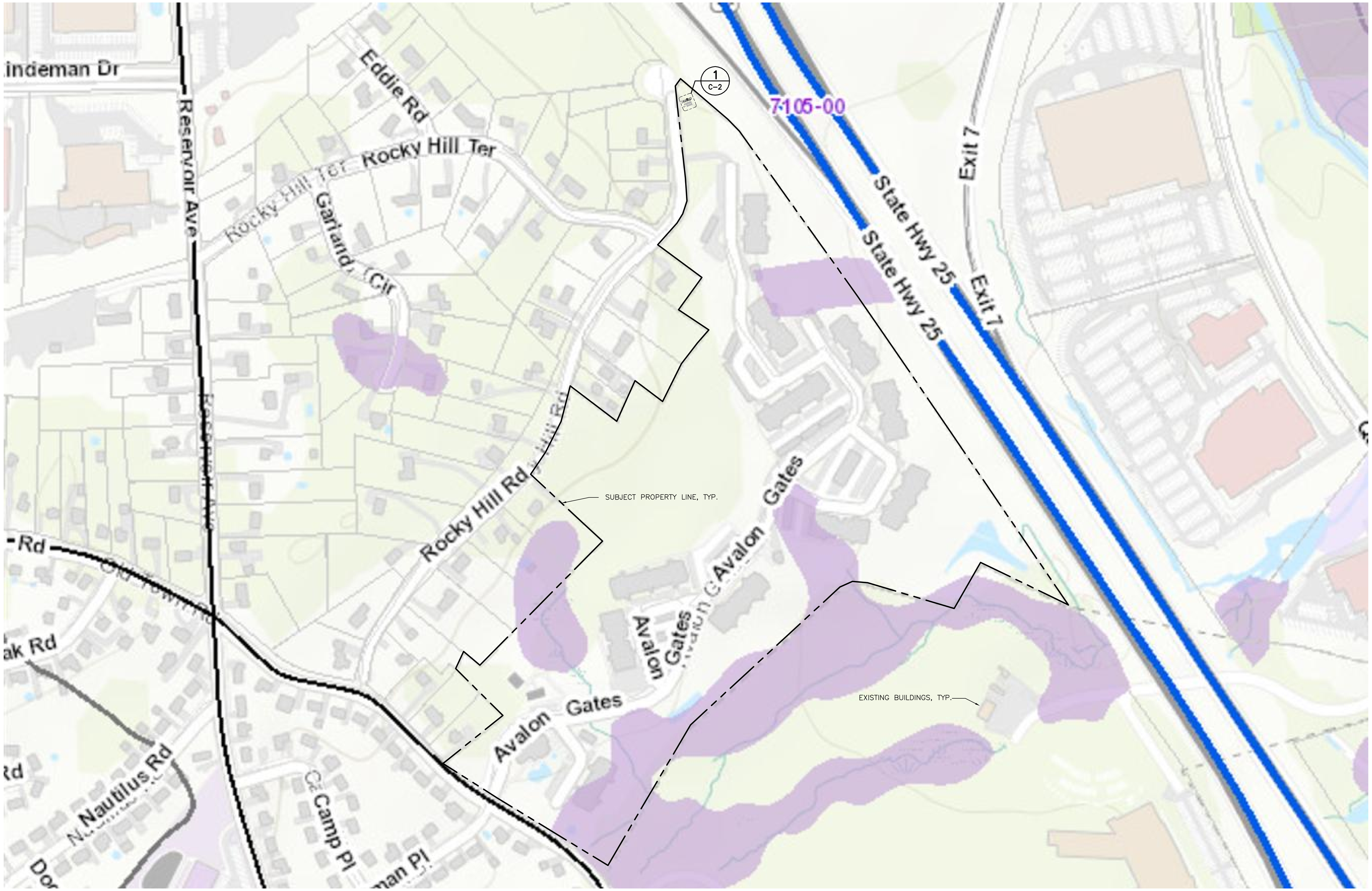
WIRELESS COMMUNICATIONS FACILITY
CL&P AT MP
SITE ID: CT11080B
ROCKY HILL ROAD (POLE 845)
TRUMBULL, CT 06611

DATE: 3/7/19
SCALE: AS NOTED
JOB NO. 18058.43

DESIGN BASIS AND SITE NOTES

N–1



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 150'

APPROX. NORTH

GRAPHIC SCALE
150 0 75 150 300 600
(IN FEET)
1 inch = 150 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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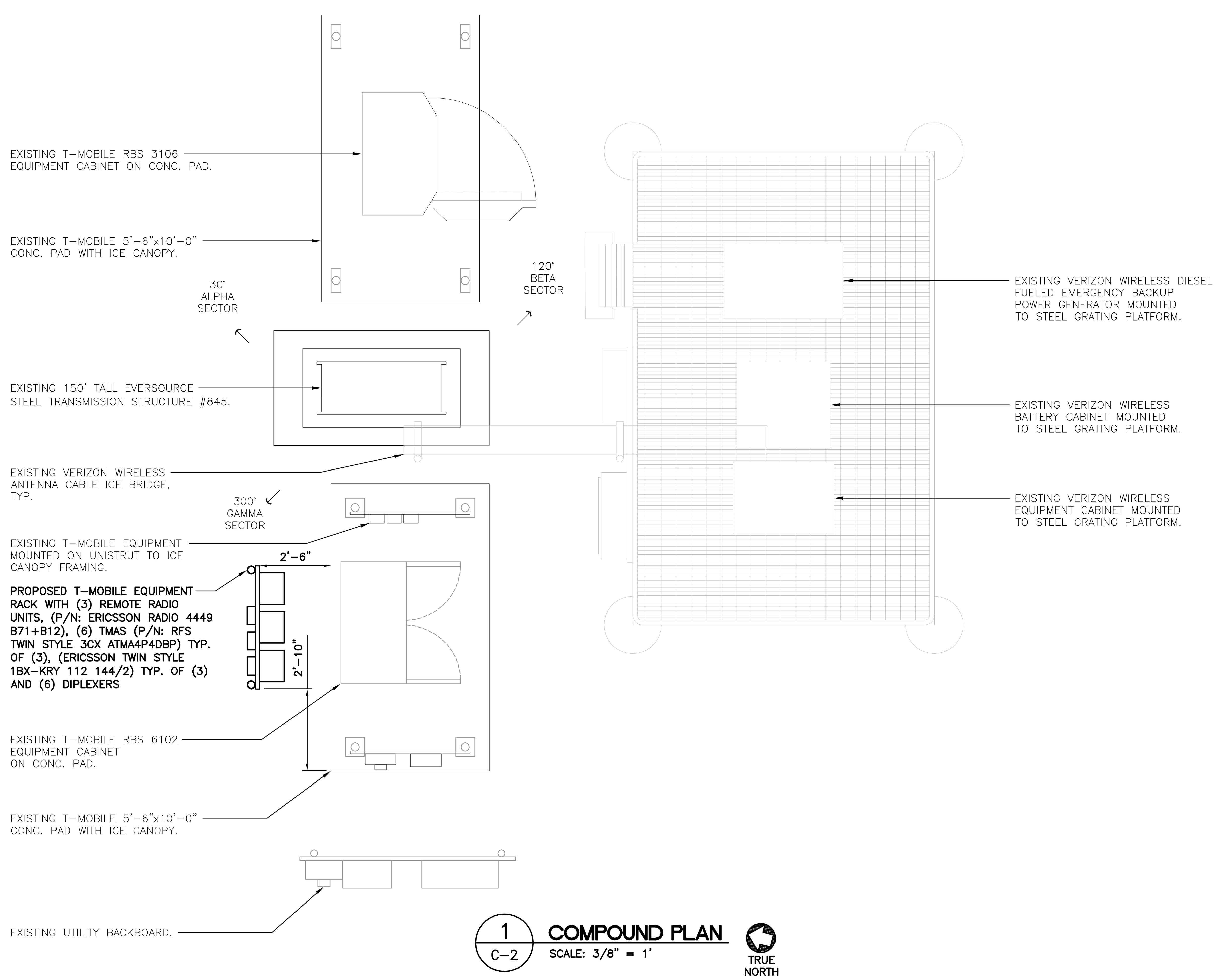
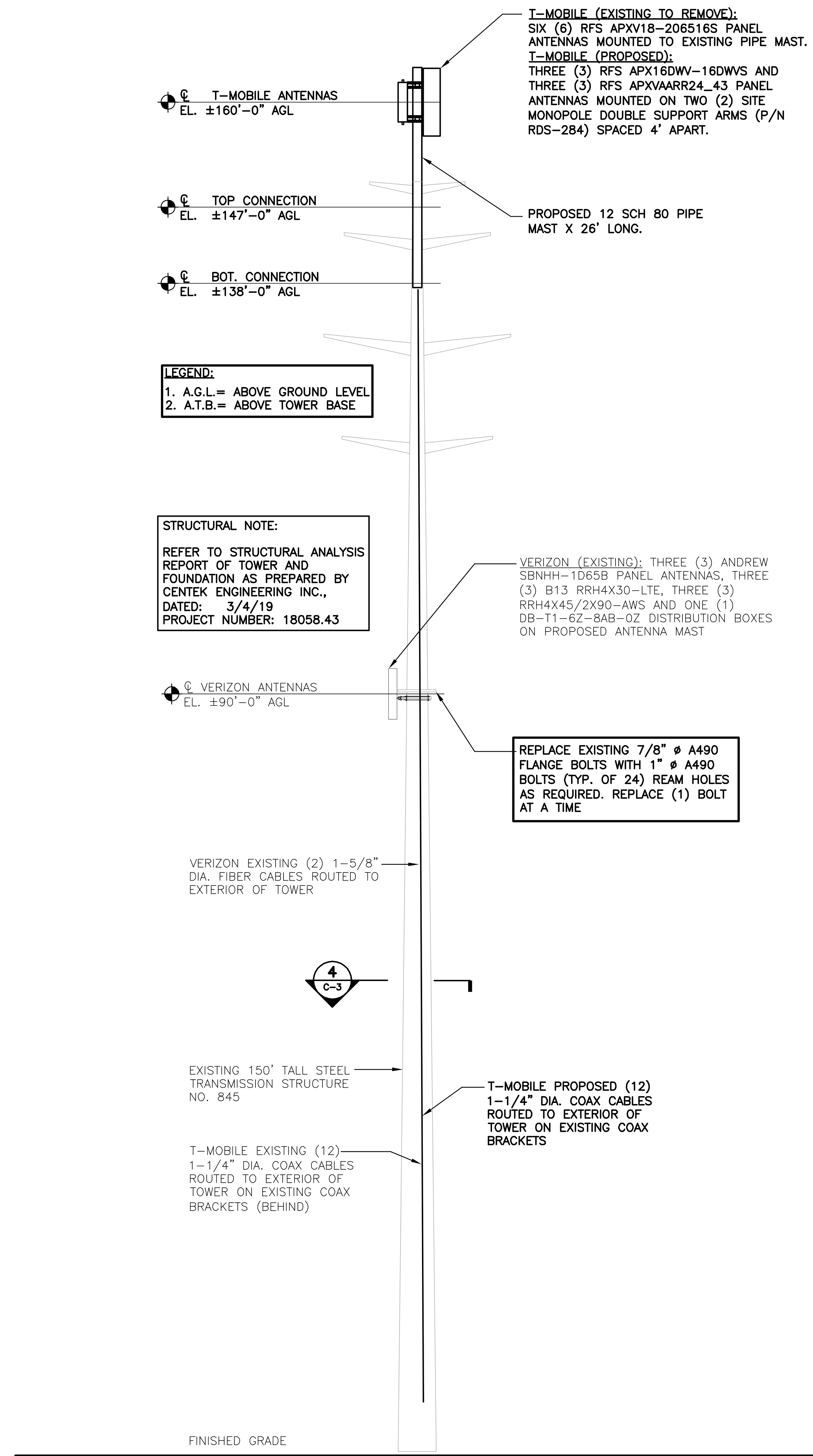
SITE LOCATION PLAN

C-1

Sheet No. 3 of 7



1 / C-2 **COMPOUND PLAN**
SCALE: 3/8" = 1'



2 / C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1" = 10'

GRAPHIC SCALE
15 0 7.5 15 30 60
(IN FEET)
1 inch = 15 ft.

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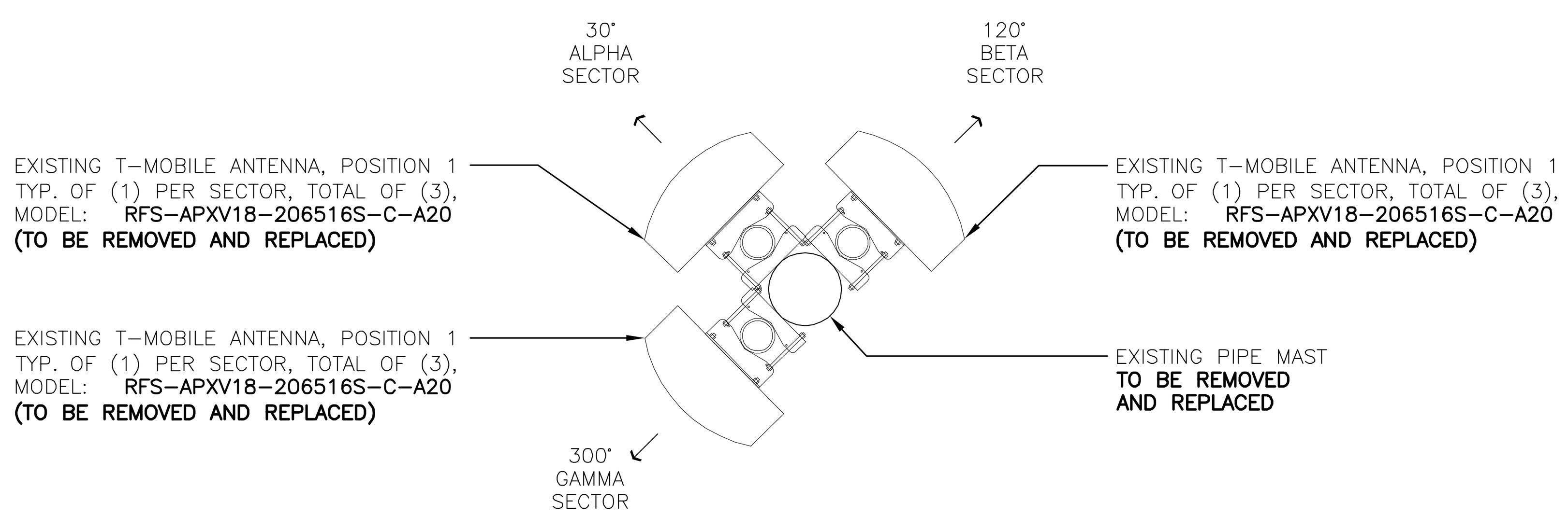
TRUMBULL, CT 06611

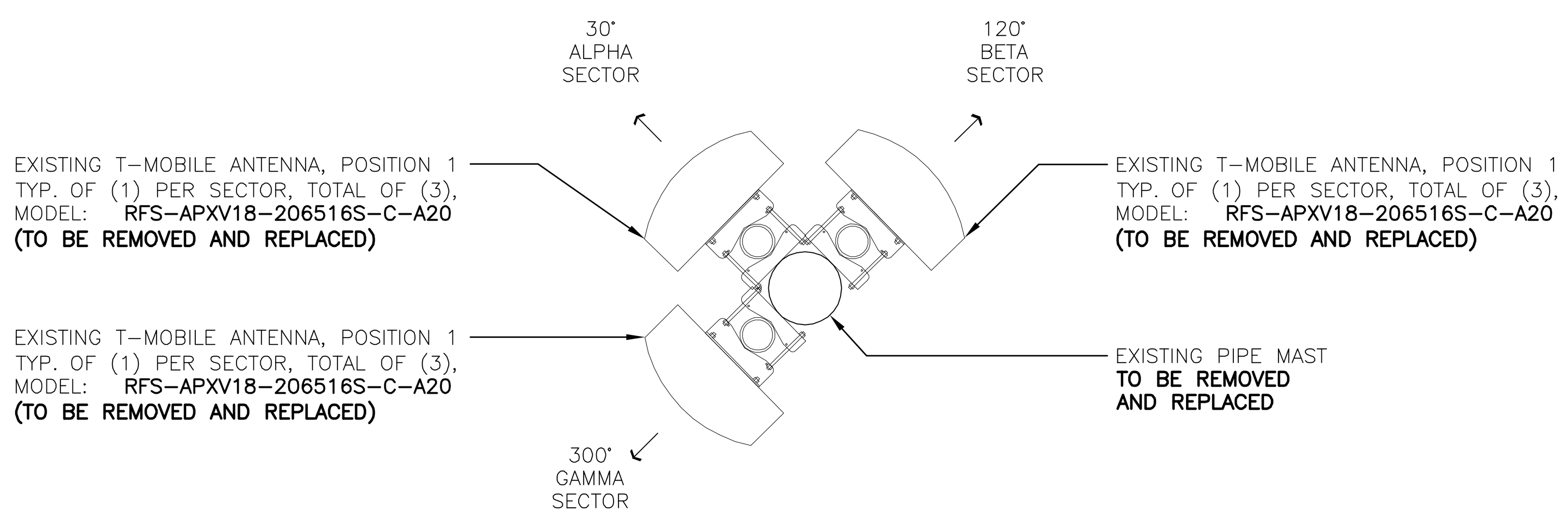
DATE:	3/7/19
SCALE:	AS NOTED
JOB NO.	18058.43

COMPOUND PLAN AND ELEVATION

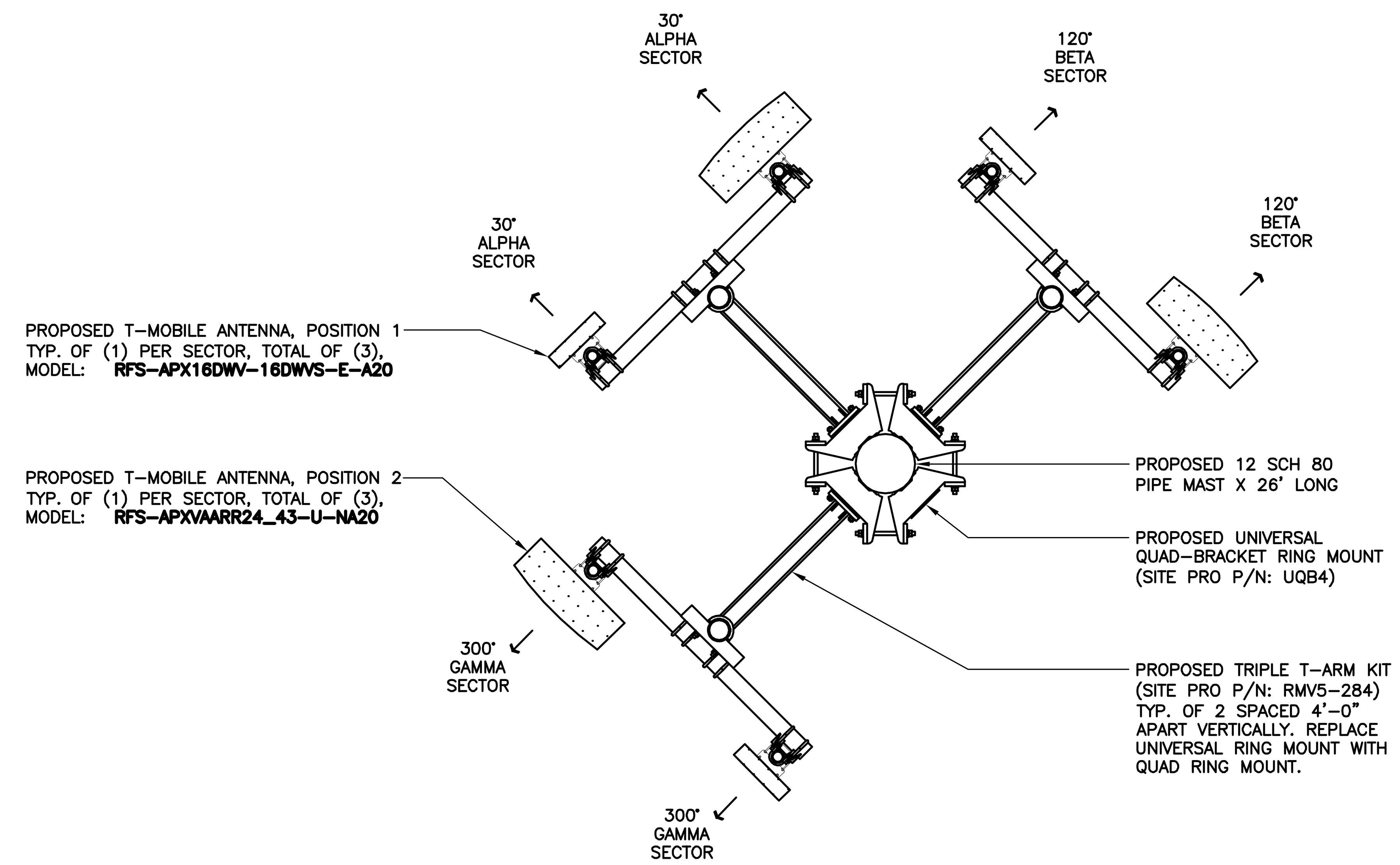
C-2



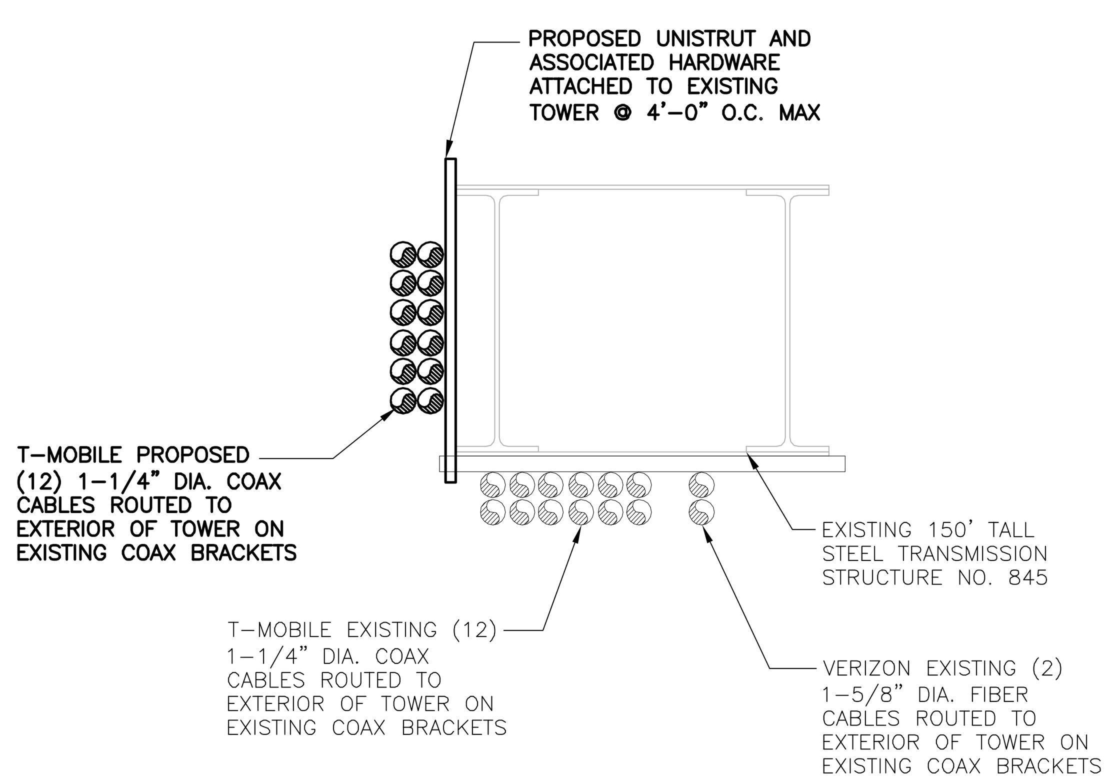
1 C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: NTS — 164' ELEVATION — TRUE NORTH



2 C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: NTS — 156' ELEVATION — TRUE NORTH



3 C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' — 160' ELEVATION — TRUE NORTH



4 C-3 **FEEDLINE PLAN**
SCALE: 1" = 1'-0"

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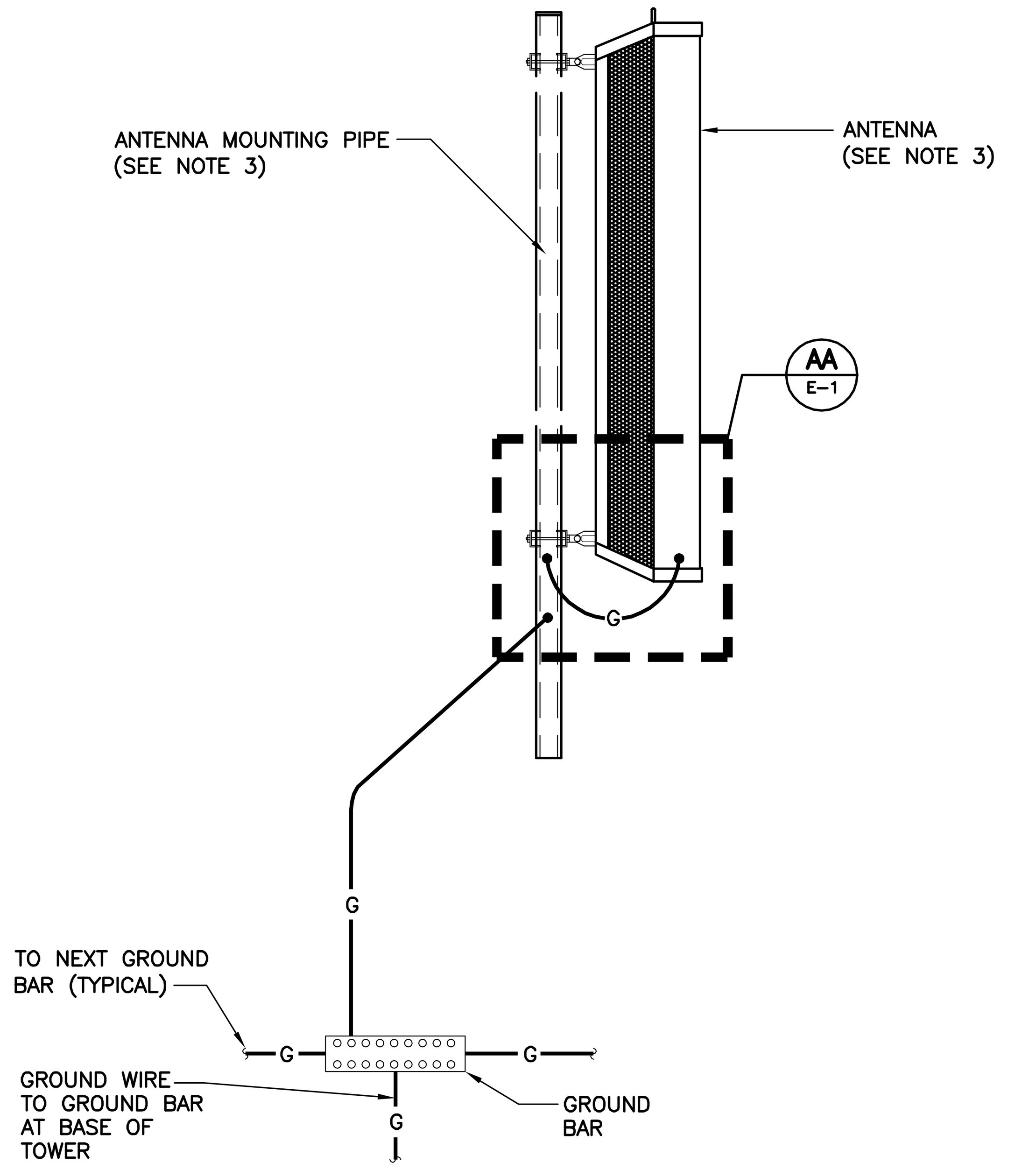
SCALE: AS NOTED
JOB NO. 18058.43

ANTENNA CONFIG. AND FEELINE PLAN

C-3

Sheet No. 5 of 7

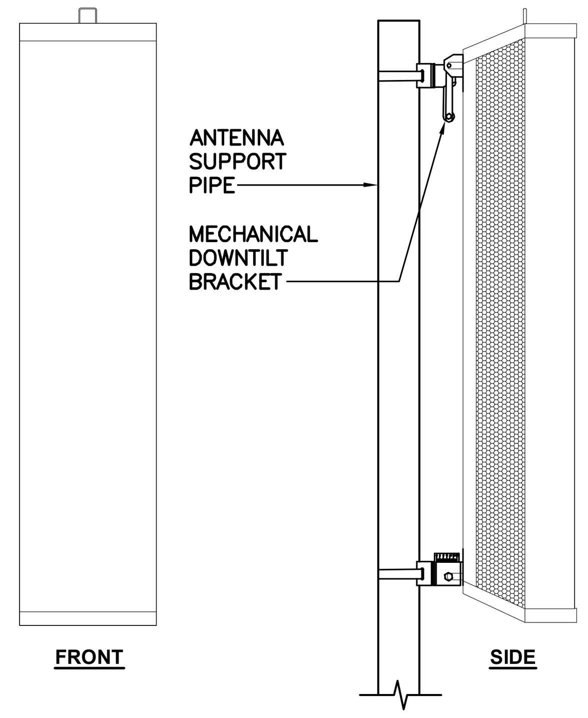


NOTES:

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 (C-4) TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



BOTTOM RFS ANTENNA

RFS ANTENNA

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR24_43-U-NA20	95.9"L x 24.0"W x 8.7"D	154 LBS.
MAKE: RFS MODEL: APX16DWV-16DWVS-E-A20	55.9"L x 13.0"W x 3.15"D	45 LBS.

2 (C-4) PROPOSED ANTENNA DETAIL

SCALE: NONE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.

3 (C-4) PROPOSED RRU DETAIL

SCALE: NONE

TMA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: ATMA4P4DBP-1A20	11.2"L x 8.0"W x 4.9"D	15.85 LBS.
MAKE: ERICSSON MODEL: KRY 112 144/2	6.1"L x 6.9"W x 2.8"D	11.02 LBS.

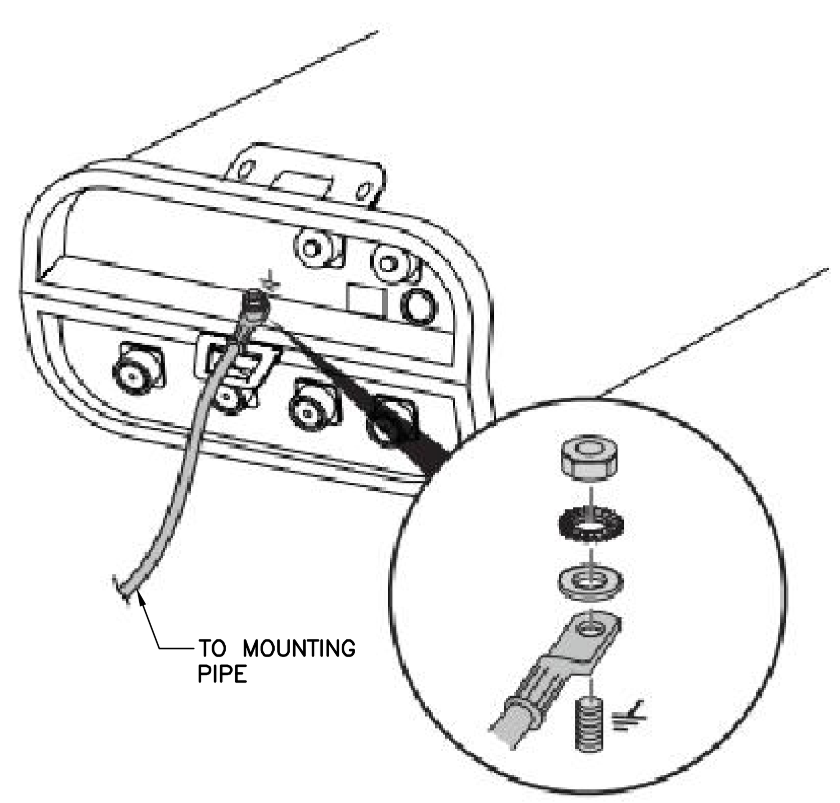
4 (C-4) PROPOSED TMA DETAIL

SCALE: NONE

DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: FDAP5002-1A20	6.5"L x 8.3"W x 3.3"D	6.4 LBS.

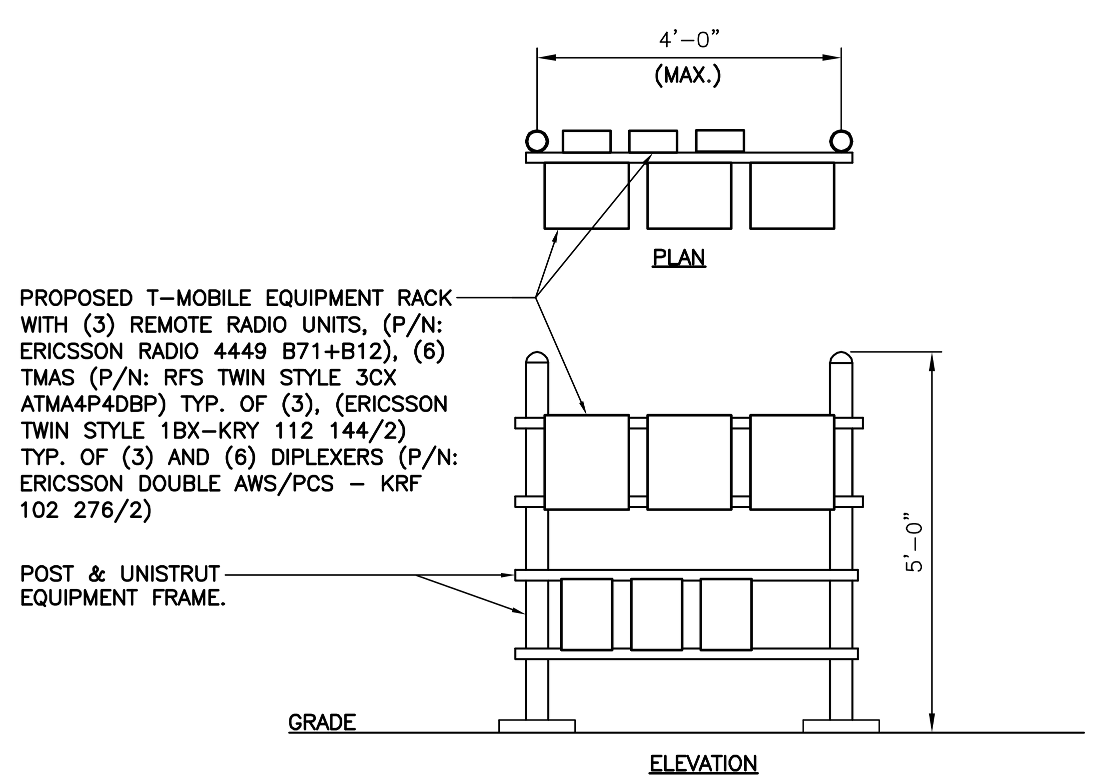
5 (C-4) PROPOSED DIPLEXER DETAIL

SCALE: NONE



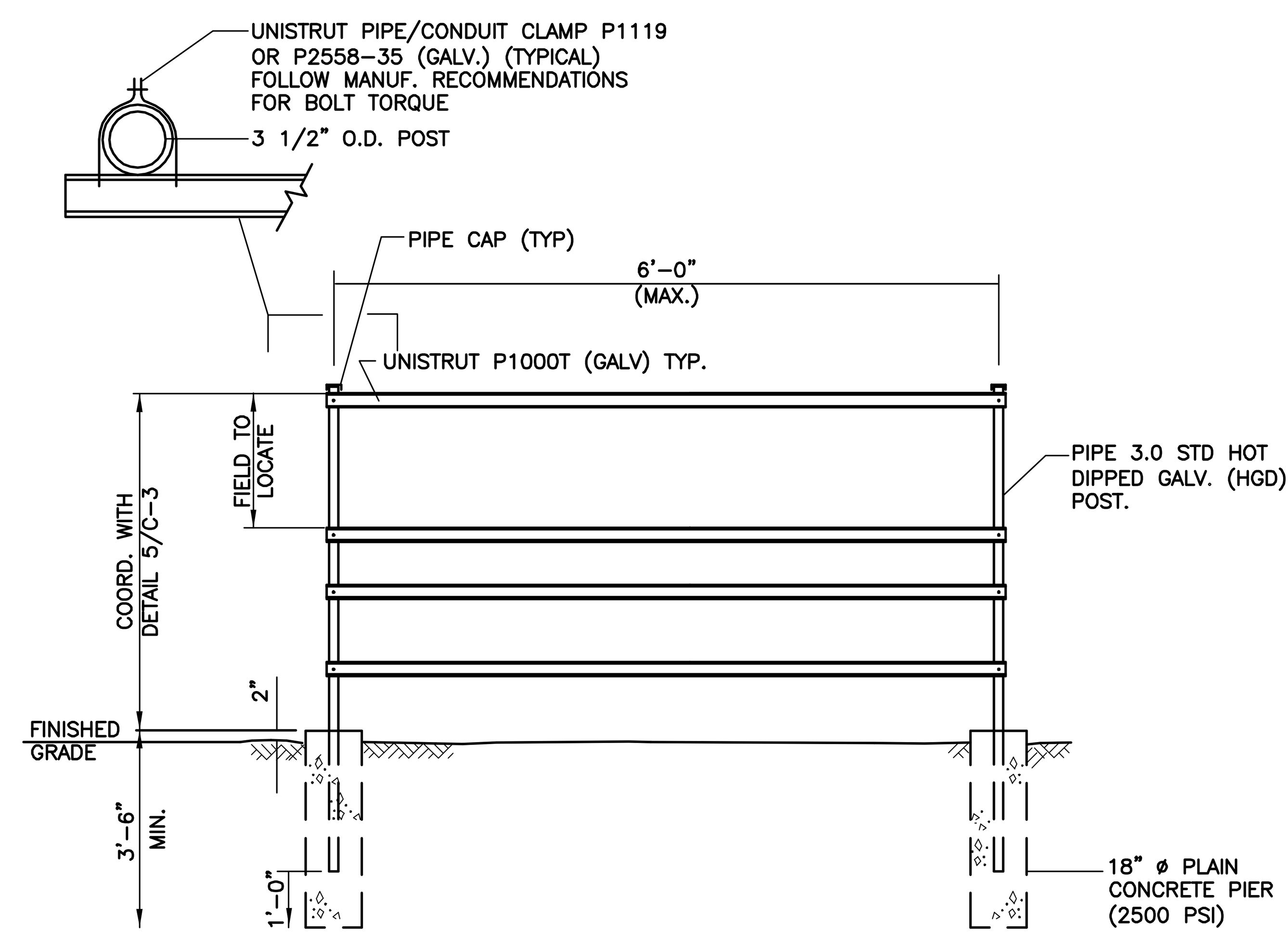
AA (C-4) TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NONE



6 (C-4) PROPOSED EQUIPMENT RACK

SCALE: 1/2" = 1'-0"



7 (C-4) PROPOSED EQUIPMENT MOUNTING FRAME DETAIL

SCALE: NOT TO SCALE

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WIRELESS COMMUNICATIONS FACILITY

CL&P AT MP

SITE ID: CT11080B

ROCKY HILL ROAD (POLE 845)
TRUMBULL, CT 06611

DATE:	3/7/19
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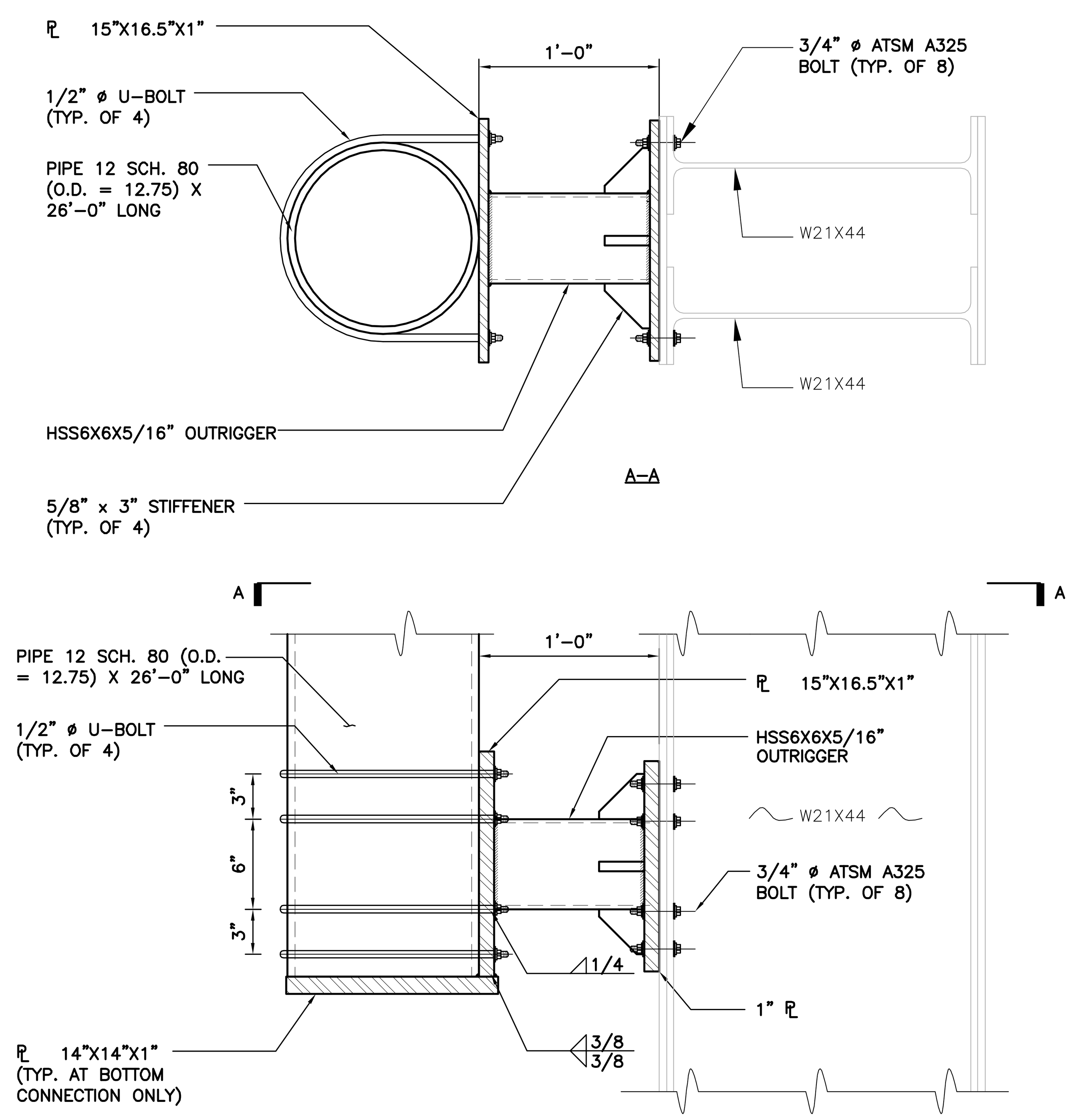
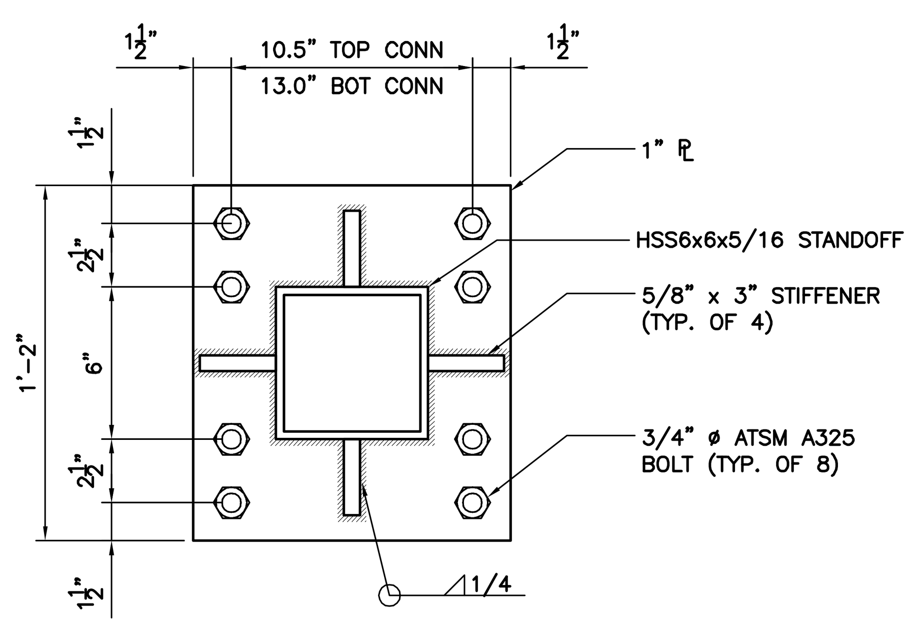
TYPICAL DETAILS

C-4





2 / S-1 **CONNECTION PLATE DETAIL**
SCALE: 2" = 1'-0"

1 / S-1 **STANDOFF ARM DETAIL**
SCALE: 1-1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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MAST REPLACEMENT DETAILS

S-1

Sheet No. 7 of 7

CENTEK engineering

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Structural Design of Antenna Mast and Tower Analysis

T-Mobile Site Ref: CT11080B

Structure No. 845
150' Electric Transmission Tower

Rocky Hill Road
Trumbull, CT

CENTEK Project No. 18058.43

~~Date: December 20, 2018~~
Rev 2: March 4, 2019

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to design an antenna mast and analyze the existing 150' tower located on Rocky Hill Road in Trumbull, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- T-MOBILE (Existing to Remain):
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables running on the exterior of the existing tower.
- T-MOBILE (Existing to Remove):
  Antennas: Three (3) RFS APXV18-206516S panel antennas mounted on an existing mast with a RAD center elevation of 164-ft above grade and three (3) RFS APXV18-206516S panel antennas mounted on an existing mast with a RAD center elevation of 156-ft above grade.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APX16DWV-16DWVS and three (3) RFS APXVAARR24_43 panel antennas mounted on a proposed mast with a RAD center elevation of 160-ft above grade.
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables running on the exterior of the existing tower.
- VERIZON (EXISTING):
  Antennas: Three (3) Andrew SBNHH-1D65B panel antennas mounted on a proposed antenna mast with a RAD center elevation of ±90-ft above grade level.
  Appurtenances: Three (3) Alcatel-Lucent B13 RRH4x30-LTE remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z distribution box mounted on a proposed antenna mast.
  Coax Cables: Two (2) 1-5/8" ∅ fiber cables running on the exterior of the existing tower.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 12-in x 26-ft long SCH. 80 pipe (O.D. = 12.75") connected at two points to the existing tower. The proposed mast was designed to resist loads prescribed by the TIA-222G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA-222-G loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the pole structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", NESC C2-2012 and Northeast Utilities Design Criteria.

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures",

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.…………………………….. 4.0 psf
  Radial Ice Thickness………………………. 0.5"
  Vertical Overload Capacity Factor…………. 1.50
  Wind Overload Capacity Factor…………….. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed.………………………………… 110 mph [1]
  Radial Ice Thickness………………………. 0"

  Note 1: NESC C2-2012, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

  Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the Eversource Design Criteria Table, TIA-222-G and AISC standards.

  Load cases considered:

  Load Case 1:
  Wind Speed………………………………... 97 mph (2016 CSBC Appendix-N)
  Radial Ice Thickness………………………. 0”

  Load Case 2:
  Wind Pressure.……………………………. 50 mph wind pressure
  Radial Ice Thickness……………………….. 0.75”

R e s u l t s

- MAST ASSEMBLY

  The existing mast was found to be structural inadequate to support the new equipment configuration and will need to be replaced with a 12-in x 26-ft long SCH. 80 pipe.

Component	Stress Ratio (percentage of capacity)	Result
12” Sch. 80 Pipe	53.4%	**PASS**
Outrigger	61.8%	**PASS**
Connection to Tower	66.4%	**PASS**

Horizontal Displacement (% of Cantilever Height)	Allowable	Result
0.28 %	1.5 %	**PASS**

- UTILITY TOWER

  This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 48-11, “Design of Steel Transmission Pole Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

  A maximum usage of **99.5%** occurs in the utility pole under the **NESC Extreme** loading condition.

  TOWER SECTION:

  The utility structure was found to be within allowable limits.

Tower Section	Stress Ratio (% of capacity)	Result
0’ AGL	99.5%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 4-ft x 7.5-ft x 14-ft long reinforced concrete pier and an 18-ft x 22-ft x 2.5-ft thick reinforced concrete pad. The base of the tower is connected to the foundation by means of (26) 2.25”∅, ASTM A615 Grade 60 anchor bolts embedded into the concrete foundation structure.

Subgrade properties were taken from a soil investigation done by DR. Clarence Welti, P.E., P.C. dated July 7, 2009.

BASE REACTIONS:

From analysis of utility tower based on NESC/NU prescribed loads.

Load Case	Shear (kips)	Axial (kips)	Moment (k-ft)
NESC Heavy Wind x-dir	22.5	104.5	3151
NESC Extreme Wind x-dir	40.3	50.9	4788
NESC Heavy Wind z-dir	11.1	104.5	1347
NESC Extreme Wind z-dir	35.6	50.9	3542

Note 1 – 10% increase to be applied to the above tower base reactions for foundation verification per OTRM 051

FLANGE BOLTS / FLANGE PLATE:

The flange bolts and plate were found to be within allowable limits with the replacement of the 7/8” bolts with 1” bolts.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Flange Bolts	Tension	96.0%	**PASS**
Flange Plate	Bending	99.8%	**PASS**

ANCHOR BOLTS / BASE PLATE:

The bolts and plate was found to be within allowable limits.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Anchor Bolts	Tension	81.7%	**PASS**
Base Plate	Bending	94.5%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Pad and Pier	Uplift	1.0 FS (1)	2.56 FS (1)	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusion

This analysis shows that the subject utility tower **with the flange bolt replacement is adequate** to support the proposed equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource and T-Mobile Wireless. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [(1)]

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as "masts"), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222-G covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2012 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in "unifying" both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: Prepared from documentation provide from Northeast Utilities.

Antenna Mast

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA-222-G:

ELECTRIC TRANSMISSION TOWER

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled "NU Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2012 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A
Eversource Design Criteria

<table>
<tr><td></td><td></td><td>Attachment A
NU Design Criteria</td><td>Basic Wind Speed</td><td>Pressure</td><td>Height factor</td><td>Gust Factor</td><td>Load or Stress Factor</td><td>Force Coef. - Shape Factor</td></tr>
<tr><td></td><td></td><td></td><td>V (MPH)</td><td>Q (PSF)</td><td>Kz</td><td>Gh</td><td></td><td></td></tr>
<tr><td rowspan="4">Ice Condition</td><td>TIA/EIA</td><td>Antenna Mount</td><td>TIA</td><td>TIA (0.75Wi)</td><td>TIA</td><td>TIA</td><td>TIA, Section 3.1.1.1 disallowed for connection design</td><td>TIA</td></tr>
<tr><td rowspan="3">NESC Heavy</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)</td><td>____</td><td>4</td><td>1</td><td>1</td><td>2.50</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)</td><td>____</td><td>4</td><td>1</td><td>1</td><td>2.50</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by NU</td></tr>
<tr><td rowspan="4">High Wind Condition</td><td>TIA/EIA</td><td>Antenna Mount</td><td>85</td><td>TIA</td><td>TIA</td><td>TIA</td><td>TIA, Section 3.1.1.1 disallowed for connection design</td><td>TIA</td></tr>
<tr><td rowspan="3">NESC Extreme Wind</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,
Rule 250C: Extreme Wind Loading
Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,
Rule 250C: Extreme Wind Loading
Height above ground is based on overall height to top of tower/pole</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by NU</td></tr>
<tr><td colspan="2" rowspan="4">NESC Extreme Ice with Wind Condition *</td><td>Tower/Pole Analysis with antennas extending above top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,
Rule 250D: Extreme Ice with Wind Loading
4 PSF Wind Load 1.25 X Gust Response Factor
Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Tower/Pole Analysis with antennas below top of Tower/Pole</td><td colspan="5">For wind speed use OTRM 060 Map 1,
Rule 250D: Extreme Ice with Wind Loading
4 PSF Wind Load
Height above ground is based on overall height to top of tower/pole</td><td>1.6 Flat Surfaces
1.3 Round Surfaces</td></tr>
<tr><td>Conductors:</td><td colspan="6">Conductor Loads Provided by NU</td></tr>
<tr><td colspan="7">* Only for structures installed after 2007</td></tr>
</table>

mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, “Eversource Design Criteria.” This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA’s etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by Eversource).

c) Electric Transmission Structure

   i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

   ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2
Pole with Coaxial Cable	1.6

   iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

d) The uniform loadings and factors specified for the above components in Attachment A, “Eversource Design Criteria” are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

   Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and Eversource will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

Project: *Lines 1714 & 1710, Structure 845*
Date: *10/19/2018*
Engineer: *TG*
Checked by: *JS*
Purpose *Recalculate wire loads.*

1714 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *FOCAS 0.738" OPGW, sagged in PLS-CADD*

1710 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *7#8 Alumoweld, sagged in PLS-CADD*

NESC 250B

	Vertical	*Transverse*	*Longitudinal*
Conductor	4759	2046	0
Alumoweld	1202	1101	0
OPGW	1973	1475	0

HISTORICAL NESC 250C

	Vertical	*Transverse*	*Longitudinal*
Conductor	2109	2349	0
Alumoweld	329	607	0
OPGW	675	1185	0

ANTENNA INSTALLATION

EVERSOURCE STRUCT. NO. 845
T-MOBILE SITE REF: CT11080B
ROCKY HILL ROAD
TRUMBULL, CT 06611

VICINITY MAP

PROJECT SUMMARY

SITE ADDRESS:	ROCKY HILL ROAD TRUMBULL, CT 06611
PROJECT COORDINATES:	LAT: 41°-13'-53.64"N LON: 73°-11'-24.00"W ELEV:±156' AMSL
EVERSOURCE STRUCT NO:	845
EVERSOURCE CONTACT:	JOEL SZARKOWICZ 860.728.4503
T-MOBILE SITE REF.:	CT11080B
T-MOBILE CONTACT:	DAN REID 203.592.8291
ANTENNA CL HEIGHT:	160'-0" AGL
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY LYNN, PE 203-433-7507

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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N-2	STRUCTURAL STEEL NOTES	1
MI-1	MODIFICATION INSPECTION REQUIREMENTS	1
S-1	TOWER ELEVATION & FEEDLINE PLAN	1
S-2	ANTENNA MAST DETAILS	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/13/18	TJL	CAG	ISSUED FOR EVERSOURCE REVIEW
1	2/12/19	TJL	CAG	ISSUED FOR CONSTRUCITON

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CENTEK engineering
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T-MOBILE
ANTENNA INSTALLATION
CT11080B
STRUCTURE 845
ROCKY HILL ROAD
TRUMBULL, CT 06611

DATE: 11/13/18
SCALE: AS SHOWN
JOB NO. 18058.43

TITLE SHEET

SHEET NO.
T-1
Sheet No. 1 of 6

DESIGN BASIS

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.

2. TIA–222–G, ASCE MANUAL NO. 48–11 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2–2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 97 MPH (2018 CSBC: APPENDIX 'N')

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3–SECOND GUST) BASED ON NESC C2–2007, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS PREPARED BY CENTEK ENGINEERING, INC., FOR T–MOBILE DATED 11/13/18.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY THE FINNEY STEEL POLE CO. JOB NO. 1300.8 CIRCA 1971.

3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325–N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.

6. THE TOWER STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

8. 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 SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

9. 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. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

10. TOWER REINFORCEMENTS SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

11. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH THE TOWER REINFORCEMENT WORK.

12. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

13. 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.

14. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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0	11/13/18	TJL	CAG	ISSUED FOR CONSTRUCTION

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ROCKY HILL ROAD
TRUMBULL, CT 06611

DATE: 11/13/18
SCALE: AS SHOWN
JOB NO. 18058.43

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
N–1

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).
2. MATERIAL SPECIFICATIONS
   - 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 GRADE B (FY = 35 KSI)
3. FASTENER SPECIFICATIONS
   - A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   - B. U-BOLTS---ASTM A307
   - C. ANCHOR RODS---ASTM F1554
   - D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
4. 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.
5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
10. 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.
11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. 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.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. 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.
16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
19. FABRICATE BEAMS WITH MILL CAMBER UP.
20. 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.
21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/13/18	TJL	CAG	ISSUED FOR EVERSOURCE REVIEW
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T-MOBILE
ANTENNA INSTALLATION
CT11080B
STRUCTURE 845
ROCKY HILL ROAD
TRUMBULL, CT 06611

DATE: 11/13/18
SCALE: AS SHOWN
JOB NO. 18058.43

STRUCTURAL STEEL NOTES

SHEET NO.
N-2

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL–OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	2/12/19	TJL	CAG	ISSUED FOR CONSTRUCITON
0	11/13/18	TJL	CAG	ISSUED FOR EVERSOURCE REVIEW

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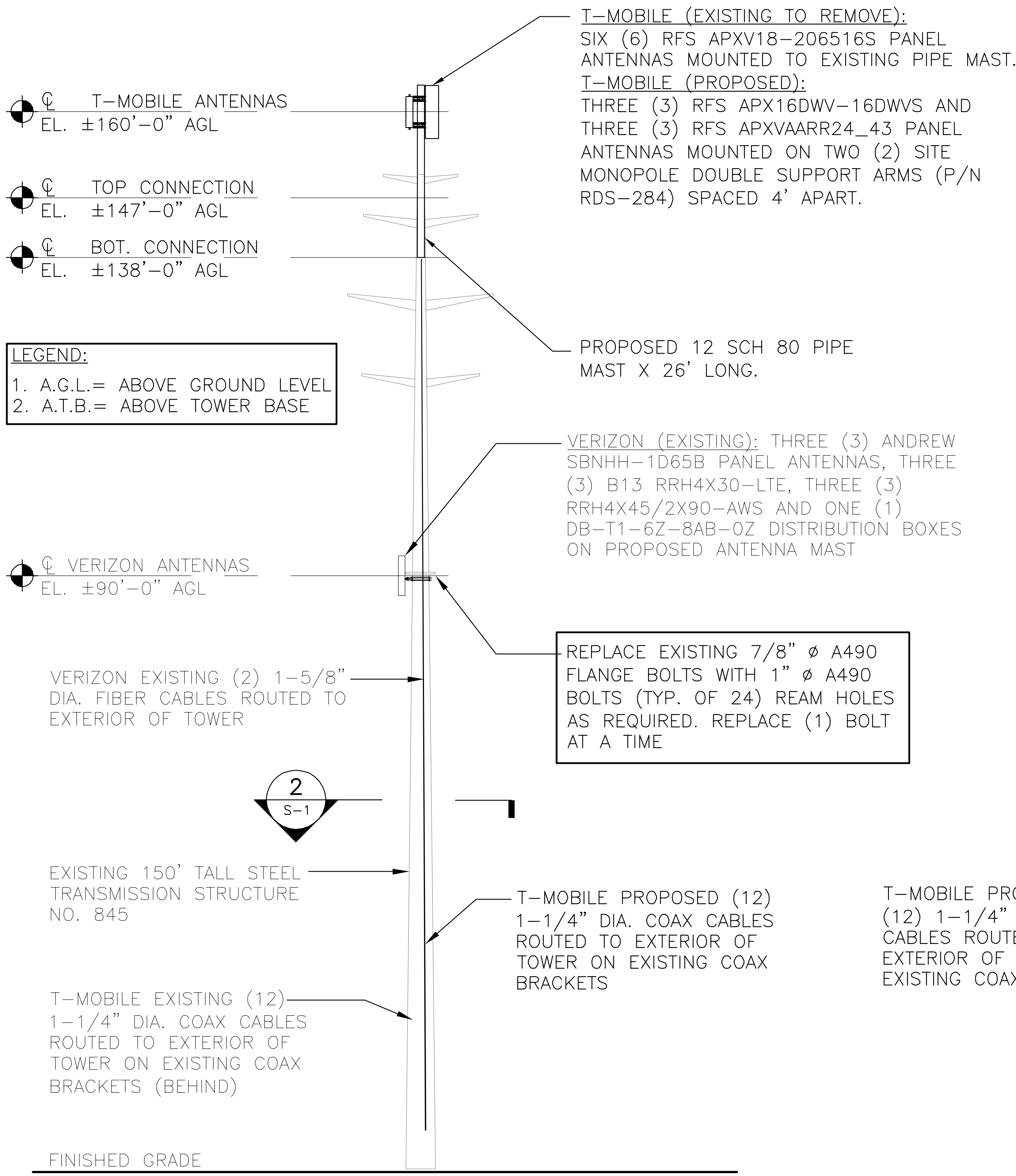
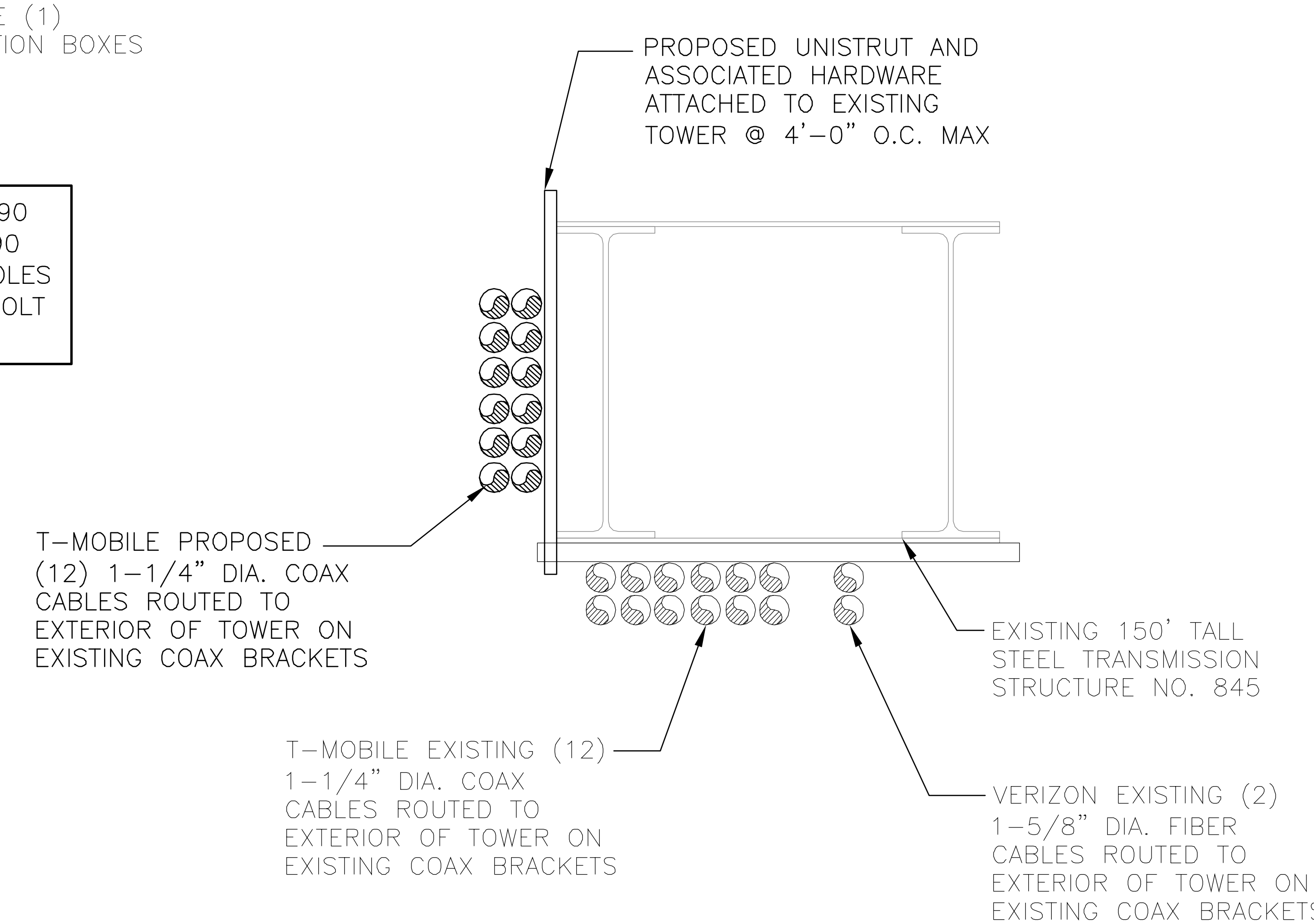
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI–1



1 S-1 TOWER & ANTENNA MAST ELEVATION

SCALE: NOT TO SCALE



2 S-1 FEEDLINE PLAN

SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	2/12/19	TJL	CAG	ISSUED FOR CONSTRUCITON
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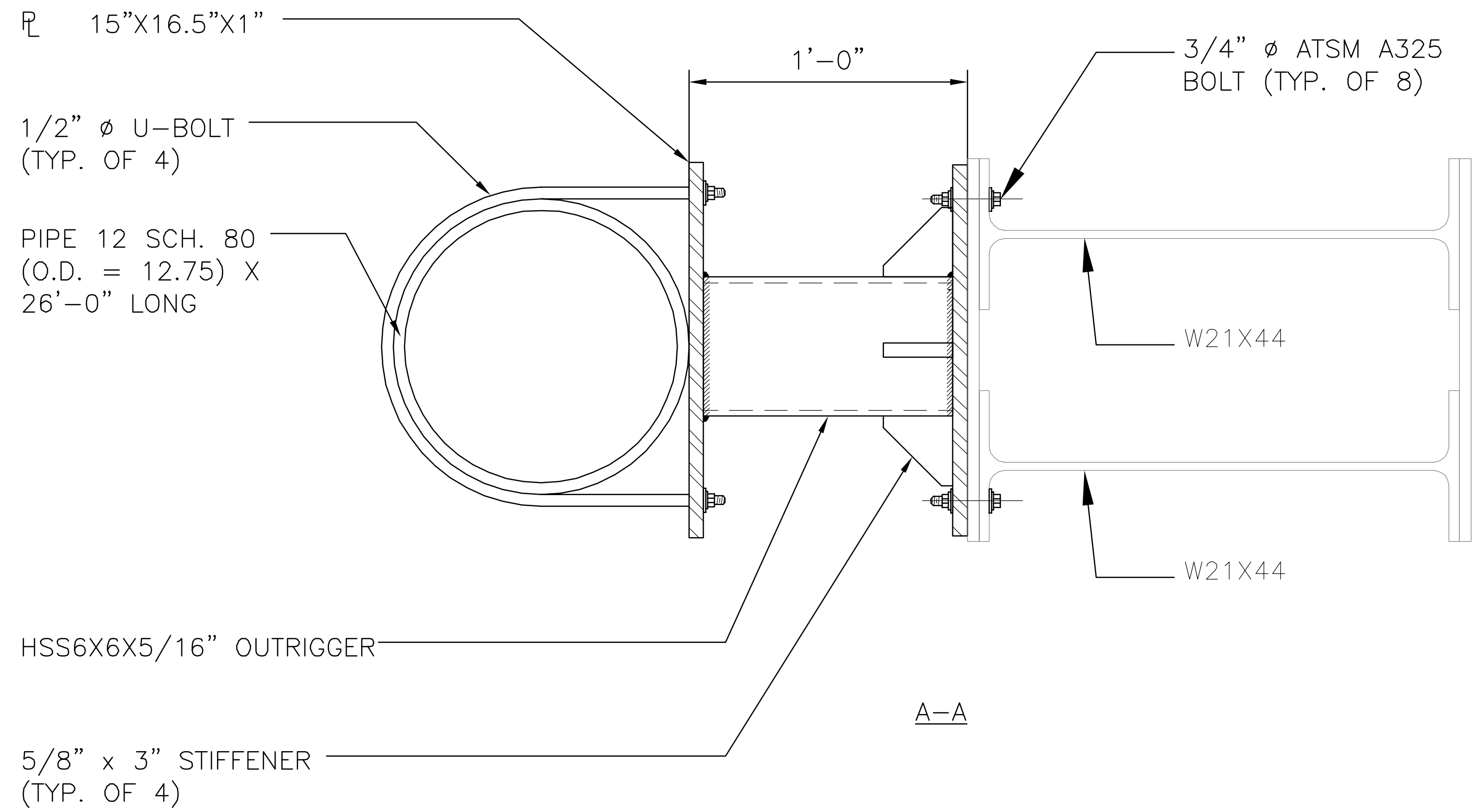
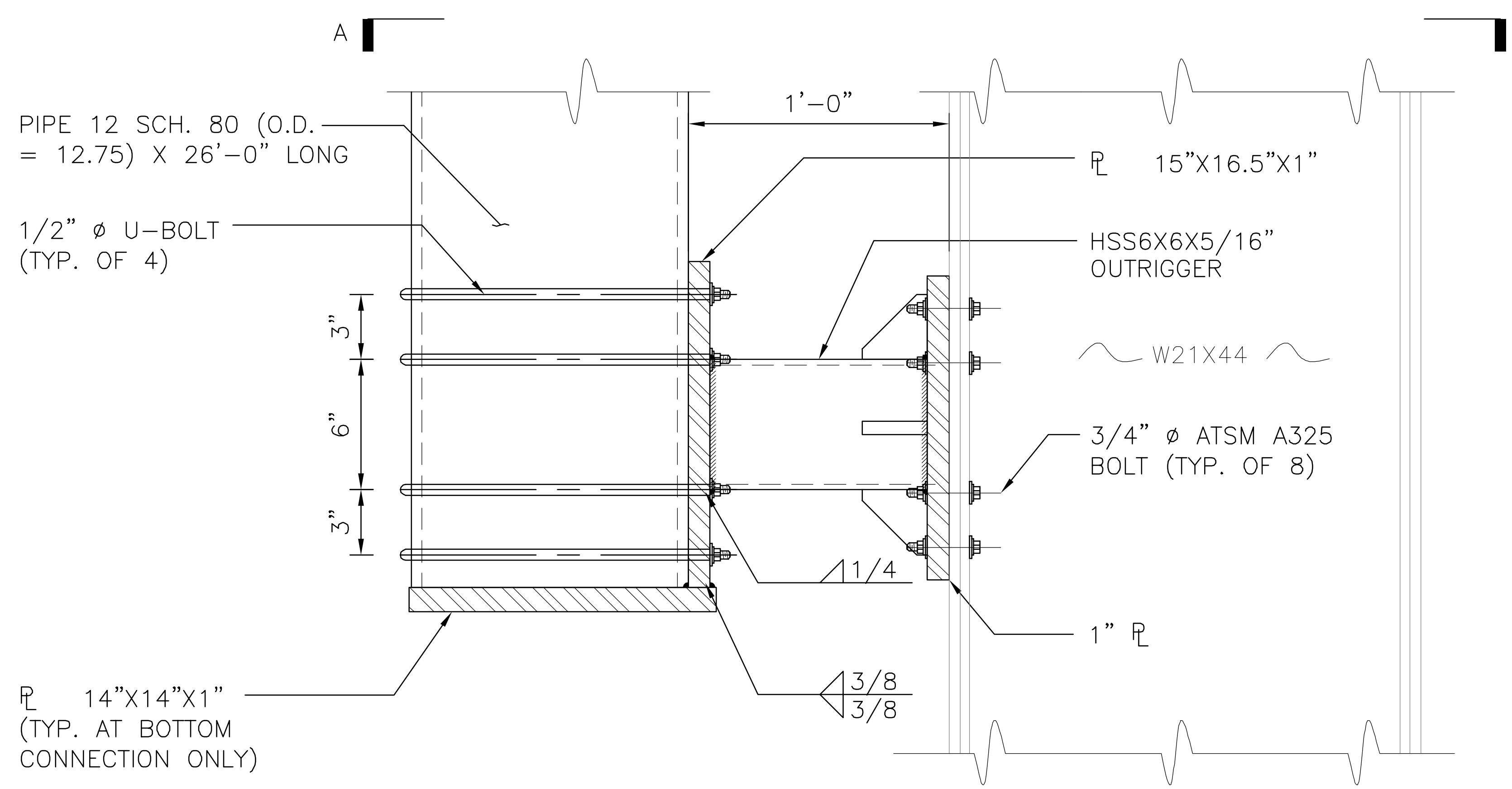
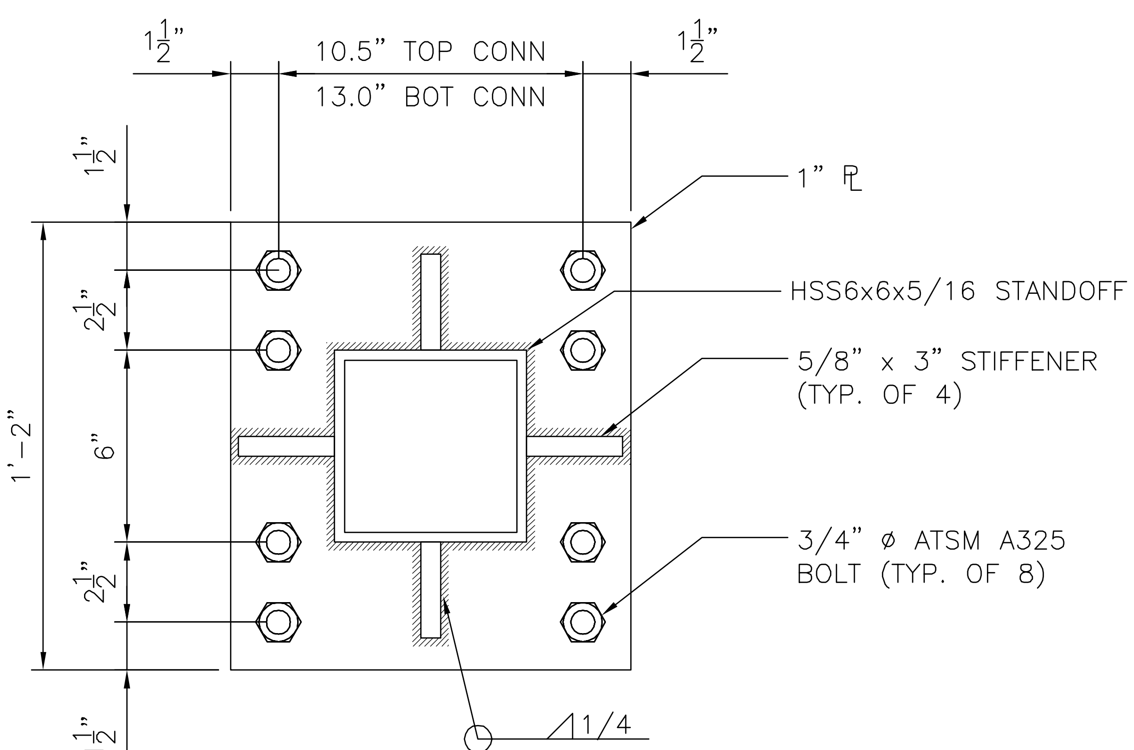
TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO. S-1

Sheet No. 5 of 6







2 S-2 CONNECTION PLATE DETAIL

SCALE: 2" = 1'-0"

1 S-2 STANDOFF ARM DETAIL

SCALE: 1-1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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0	11/13/18	TJL	CAG	ISSUED FOR EVERSOURCE REVIEW

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ANTENNA MAST DETAILS

SHEET NO. S-2

Sheet No. 6 of 6

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 97$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)
Basic Wind Speed Service Loads	$V_{Ser} := 60$	mph	(User Input - TIA-222-G Section 2.8.3)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 150$	ft	(User Input)
Height to Center of Antennas =	$z_{ant} := 160$	ft	(User Input)
Height to Center of Mast =	$z_{mast} := 151$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.15 & \text{if SC = 3} \end{cases} = 1.15$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.00 & \text{if SC = 3} \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if SC = 1} \\ 1.00 & \text{if SC = 2} \\ 1.25 & \text{if SC = 3} \end{cases} = 1.25$$

Wind Direction Probability Factor (Service) = $K_{dSer} := 0.85$ (Per Section 2.8.3 of TIA-222-G)

Importance Factor (Service) = $I_{Ser} := 1$ (Per Section 2.8.3 of TIA-222-G)

$K_{iz} := \left(\frac{z_{ant}}{33}\right)^{0.1} = 1.171$ $t_{iz.ant} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.196$

Velocity Pressure Coefficient Antennas = $Kz_{ant} := 2.01\left(\left(\frac{z_{ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.397$

Velocity Pressure w/o Ice Antennas = $qz_{ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V^2 \cdot I_{Wind} = 36.769$

Velocity Pressure with Ice Antennas = $qz_{ice.ant} := 0.00256 \cdot K_d \cdot Kz_{ant} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.495$

Velocity Pressure Service = $qz_{ant.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{ant} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.946$

$K_{izmast} := \left(\frac{z_{mast}}{33}\right)^{0.1} = 1.164$ $t_{izmast} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izmast} \cdot K_{zt}^{0.35} = 2.183$

Velocity Pressure Coefficient Mast = $Kz_{mast} := 2.01\left(\left(\frac{z_{mast}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.38$

Velocity Pressure w/o Ice Mast = $qz_{mast} := 0.00256 \cdot K_d \cdot Kz_{mast} \cdot V^2 \cdot I_{Wind} = 36.323$

Velocity Pressure with Ice Mast = $qz_{ice.mast} := 0.00256 \cdot K_d \cdot Kz_{mast} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.392$

Velocity Pressure Service = $qz_{mast.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{mast} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.813$

Development of Wind & Ice Load on Mast

Mast Data:	(12" Sch. 80 Pipe)		(User Input)		
Mast Shape =	Round		(User Input)		
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)		
Mast Length =	$L_{mast} := 26$	ft	(User Input)		
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)		
Velocity Coefficient =	$C := \sqrt{I \cdot Kz_{mast}} \cdot V \cdot \frac{D_{mast}}{12} = 121$				
Mast Force Coefficient =	$CF_{mast} = 0.6$				

Wind Load (without ice)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 1.063$	sf/ft	
Total Mast Wind Force =	$qz_{mast} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 31$	plf	**BLC 5,7**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izmast})}{12} = 1.426$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.mast} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 10$	plf	**BLC 4,6**

Wind Load (Service)

Total Mast Wind Force Service Loads =	$qz_{mast.Ser} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 9$	plf	**BLC 8**

Gravity Loads (without ice)

Weight of the mast =	Self Weight	**(Computed internally by Risa-3D)**	plf	**BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + t_{izmast} \cdot 2)^2 - D_{mast}^2\right] = 102.4$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 40$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 962$	lbs	**BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ant}) \cdot (W_{ant} + 2 \cdot t_{iz.ant})}{144} = 7.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 21.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 321$	lbs	**BLC 4,6**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 286$	lbs	**BLC 8**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 135$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz.ant})(W_{ant} + 2 \cdot t_{iz.ant}) \cdot (T_{ant} + 2 \cdot t_{iz.ant}) - V_{ant} = 5618$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 182$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 546$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPXVAARR24_43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 95.9$ in (User Input)

Antenna Width = $W_{ant} := 24$ in (User Input)

Antenna Thickness = $T_{ant} := 8.7$ in (User Input)

Antenna Weight = $WT_{ant} := 154$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$

Antenna Force Coefficient = $Ca_{ant} = 1.27$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 48$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 3014$ lbs **BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.ant}) \cdot (W_{ant} + 2 \cdot t_{iz.ant})}{144} = 19.8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 59.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 862$ lbs **BLC 4,6**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{ant.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 897$ lbs **BLC 8**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 462$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$ cu in

Volume of Ice on Each Antenna =

$$V_{ice} := (L_{ant} + 2 \cdot t_{iz.ant})(W_{ant} + 2 \cdot t_{iz.ant}) \cdot (T_{ant} + 2 \cdot t_{iz.ant}) - V_{ant} = 2 \times 10^4$$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 559$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 1677$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	SitePro Double Support Arm RDS-284 (x2)		
Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 11$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 14$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1080$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1250$	lbs	

Wind Load (without ice)

Total Mount Wind Force =	$F_{mnt} := qz_{ant} \cdot G_H \cdot CaAa = 546$	lbs	**BLC 5,7**

Wind Load (with ice)

Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.ant} \cdot G_H \cdot CaAa_{ice} = 161$	lbs	**BLC 4,6**

Wind Load (Service)

Total Platform Wind Force Service Loads =	$F_{mnt.Ser} := qz_{ant.Ser} \cdot G_H \cdot CaAa = 163$	lbs	**BLC 8**

Gravity Loads (without ice)

Weight of All Mounts =	$WT_{mnt} = 1080$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 170$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (138-ft - 150-ftAGL)

Coax Type =	HELIAX 1-1/4"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.55$	in	(User Input)
Coax Cable Length =	$L_{coax} := 12$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.66$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 2$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 92.9$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.3$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast} \cdot G_H \cdot A_{coax} = 15$ plf **BLC 5,7**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz.ant})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.mast} \cdot G_H \cdot AICE_{coax} = 8$ plf **BLC 4,6**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{mast.Ser} \cdot G_H \cdot A_{coax} = 5$ plf **BLC 8**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 8$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izmast}\right)^2 - D_{coax}^{\ 2}\right] = 25.6$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 119$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (150-ft - 160-ft AGL)

Coax Type =	HELIAX 1-1/4"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.55$	in	(User Input)
Coax Cable Length =	$L_{coax} := 10$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.66$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 24$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 24$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 4$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 77.4$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast} \cdot G_H \cdot A_{coax} = 30$ plf **BLC 5,7**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz.ant})}{12} = 0.9$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.mast} \cdot G_H \cdot AICE_{coax} = 12$ plf **BLC 4,6**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{mast.Ser} \cdot G_H \cdot A_{coax} = 9$ plf **BLC 8**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 16$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izmast})^2 - D_{coax}^2\right] = 25.6$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 239$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678
2	Outrigger	HSS6X6X5	Beam	Tube	A500 Gr.46	Typical	6.43	34.3	34.3	55.4

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	26			Lbyy						Lateral
2	M2	Outrigger	1.5			Lbyy						Lateral
3	M3	Outrigger	1.5			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	TOPMA...			Mast	Column	Pipe	A53 Gr. B	Typical
2	M2	TOPCO...	N4			Outrigger	Beam	Tube	A500 Gr....	Typical
3	M3	BOTMA...	N5			Outrigger	Beam	Tube	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	TOPCONNECTION	0	9	0	0	
2	TOPMAST	0	26	0	0	
3	BOTMAST	0	0	0	0	
4	N4	0	9	-1.5	0	
5	N5	0	0	-1.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOPCONNECTION						
2	BOTMAST						
3	N4	Reaction	Reaction	Reaction		Reaction	
4	N5	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.135	22
2	M1	Y	-.462	22
3	M1	Y	-1.08	22

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.546	22
2	M1	Y	-1.677	22
3	M1	Y	-.17	22

Member Point Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 4 : (x) TIA Wind with Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.321	22
2	M1	X	.862	22
3	M1	X	.161	22

Member Point Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.962	22
2	M1	X	3.014	22
3	M1	X	.546	22

Member Point Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.321	22
2	M1	Z	.862	22
3	M1	Z	.161	22

Member Point Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.962	22
2	M1	Z	3.014	22
3	M1	Z	.546	22

Member Point Loads (BLC 8 : TIA Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.286	22
2	M1	X	.897	22
3	M1	X	.163	22

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	12
2	M1	Y	-.016	-.016	12	18

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.04	-.04	0	0
2	M1	Y	-.119	-.119	0	12
3	M1	Y	-.239	-.239	12	18

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.01	.01	0	18
2	M1	X	.008	.008	0	12
3	M1	X	.012	.012	12	18

Member Distributed Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 5 : (x) TIA Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.031	.031	0	18
2	M1	X	.015	.015	0	12
3	M1	X	.03	.03	12	18

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.01	.01	0	18
2	M1	Z	.008	.008	0	12
3	M1	Z	.012	.012	12	18

Member Distributed Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.031	.031	0	18
2	M1	Z	.015	.015	0	12
3	M1	Z	.03	.03	12	18

Member Distributed Loads (BLC 8 : TIA Service)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.009	.009	0	18
2	M1	X	.005	.005	0	12
3	M1	X	.009	.009	12	18

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (Mast)	None		-1						
2	Weight of Appurtenances	None					3	2		
3	Weight of Ice Only	None					3	3		
4	(x) TIA Wind with Ice	None					3	3		
5	(x) TIA Wind	None					3	3		
6	(z) TIA Wind with Ice	None					3	3		
7	(z) TIA Wind	None					3	3		
8	TIA Service	None					3	3		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direction)	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-direction)	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi (X-...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-direction)	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-direction)	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0Wi (Z-d...	Yes	Y		1	1.2	2	1.2	3	1	6	1												
7	1.0D + 1.0WService	Yes	Y		1	1	2	1	8	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N4	max	0	6	.032	6	-.517	2	0	7	0	6	0	7
2		min	-19.301	1	-.019	5	-19.987	4	0	1	-28.949	1	0	1
3	N5	max	10.597	1	10.45	3	11.283	4	0	7	15.898	1	0	7
4		min	0	4	3.119	2	.517	2	0	1	0	4	0	1
5	Totals:	max	0	6	10.474	6	0	7						
6		min	-8.704	1	3.135	2	-8.704	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	TOPCONNE...	max	.058	1	.031	5	.002	4	5.369e-03	5	0	6	0	6
2		min	0	4	-.049	3	0	2	-4.109e-04	3	-2.158e-03	1	-6.291e-03	1
3	TOPMAST	max	3.102	1	.03	5	2.856	5	1.682e-02	5	0	6	0	6
4		min	0	4	-.052	3	-.084	3	-4.154e-04	3	-2.158e-03	1	-1.777e-02	1
5	BOTMAST	max	0	6	.031	5	0	2	8.812e-04	3	0	6	1.729e-03	1
6		min	-.032	1	-.047	3	-.001	4	-2.254e-03	5	-2.158e-03	1	0	4
7	N4	max	0	7	0	7	0	7	2.749e-03	3	0	7	0	6
8		min	0	1	0	1	0	1	-1.694e-03	5	0	1	-6.291e-03	1
9	N5	max	0	7	0	7	0	7	3.007e-03	3	0	7	1.729e-03	1
10		min	0	1	0	1	0	1	-1.618e-03	5	0	1	0	4

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M1	PIPE_12.0X	.534	8.9...	1	.072	8.9...		4	426....	551.25	184....	184....	...	H1-...
2	M2	HSS6X6X5	.618	1.5	1	.260	0	z	1	265....	266....	46.92	46.92	...	H1-...
3	M3	HSS6X6X5	.340	0	6	.143	0	z	1	265....	266....	46.92	46.92	...	H1-...

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N4	-19.301	.02	-.689	0	-28.949	0
2	1	N5	10.597	4.159	.689	0	15.898	0
3	1	Totals:	-8.704	4.179	0			
4	1	COG (ft):	X: 0	Y: 17.035	Z: -.014			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N4	-19.289	.015	-.517	0	-28.93	0
2	2	N5	10.585	3.119	.517	0	15.878	0
3	2	Totals:	-8.704	3.135	0			
4	2	COG (ft):	X: 0	Y: 17.035	Z: -.014			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N4	-3.673	.024	-1.736	0	-5.507	0
2	3	N5	1.981	10.45	1.736	0	2.972	0
3	3	Totals:	-1.692	10.474	0			
4	3	COG (ft):	X: 0	Y: 15.986	Z: -.006			

Joint Reactions (By Combination)

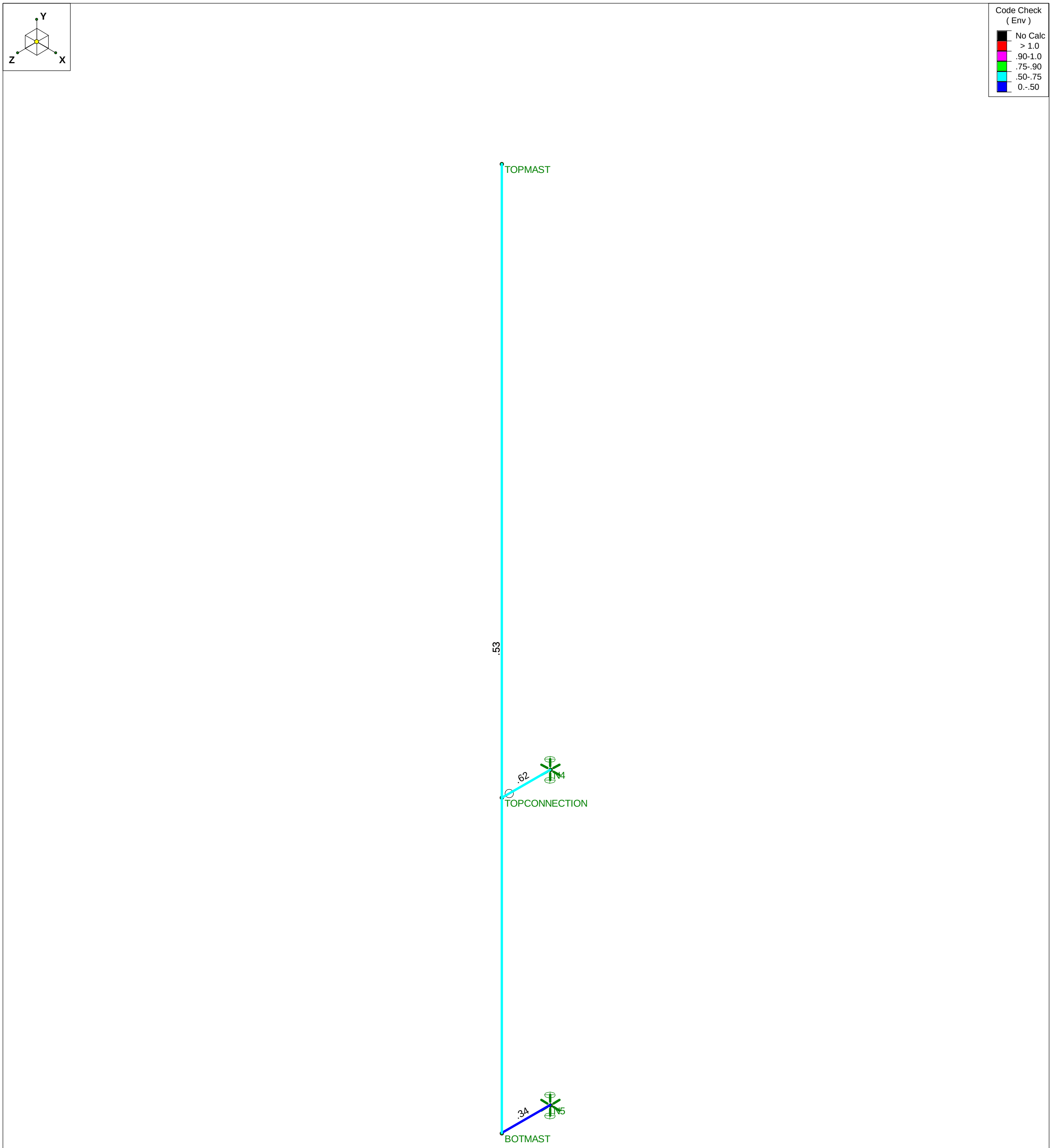
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N4	0	-.009	-19.987	0	0	0
2	4	N5	0	4.188	11.283	0	0	0
3	4	Totals:	0	4.179	-8.704			
4	4	COG (ft):	X: 0	Y: 17.035	Z: -.014			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	N4	0	-.019	-19.804	0	0	0
2	5	N5	0	3.153	11.1	0	0	0
3	5	Totals:	0	3.135	-8.704			
4	5	COG (ft):	X: 0	Y: 17.035	Z: -.014			

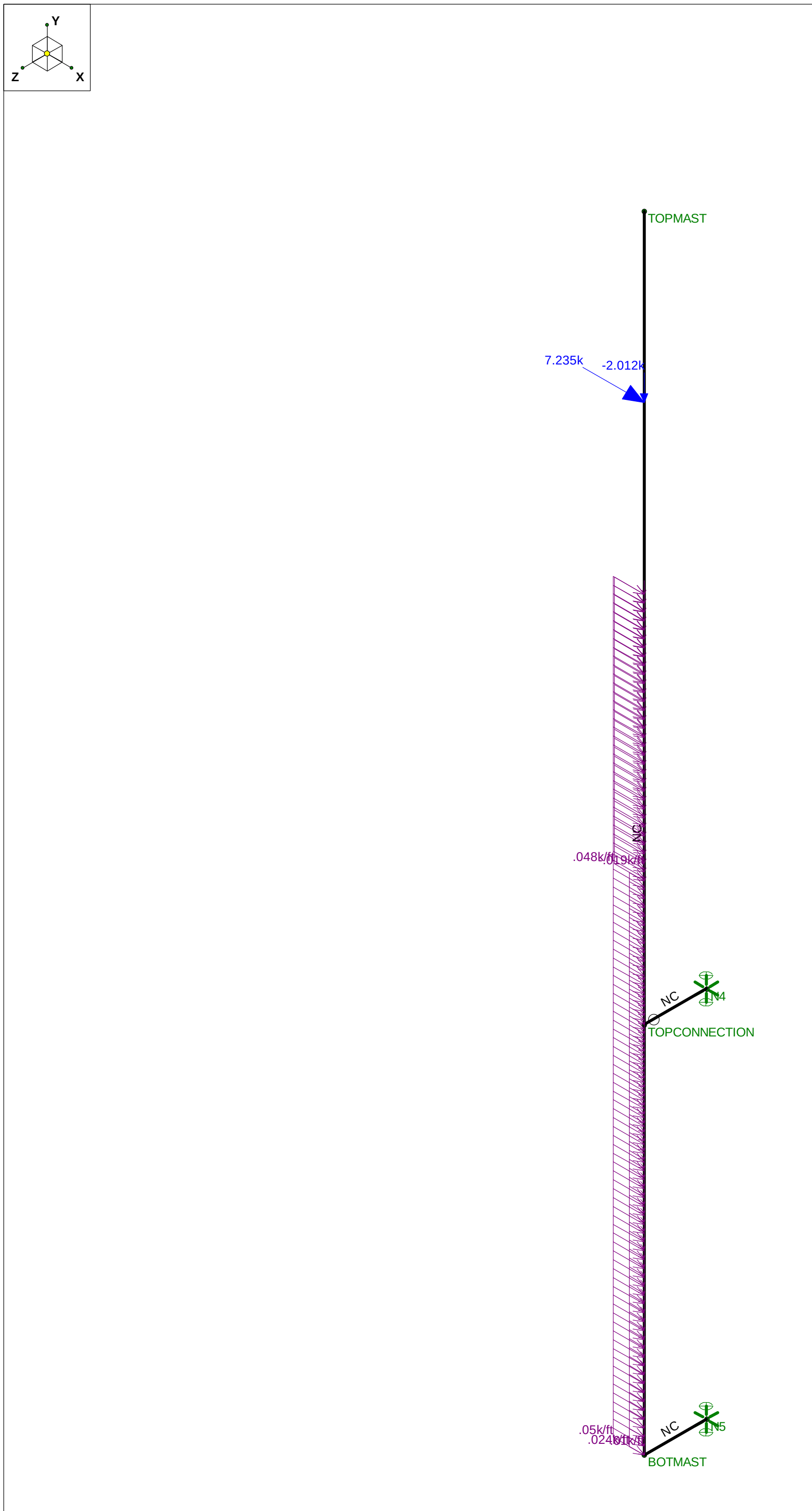
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	6	N4	0	.032	-5.405	0	0	0
2	6	N5	0	10.442	3.713	0	0	0
3	6	Totals:	0	10.474	-1.692			
4	6	COG (ft):	X: 0	Y: 15.986	Z: -.006			



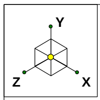
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

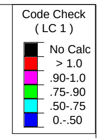
Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:08 AM
18058.43	Unity Check	T-Mobile Antenna Mast - TIA.r3d

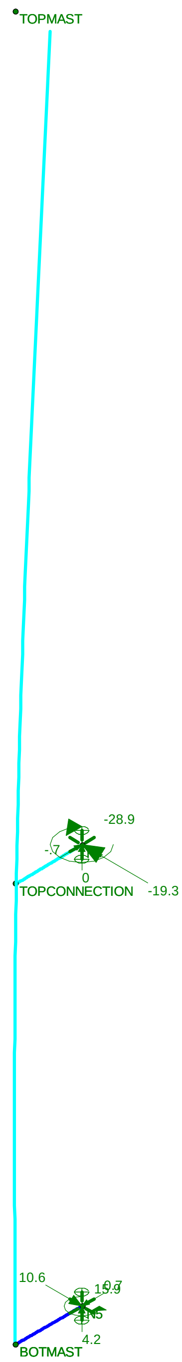


Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W (X-direction)

Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:10 AM
18058.43	LC #1 Loads	T-Mobile Antenna Mast - TIA.r3d

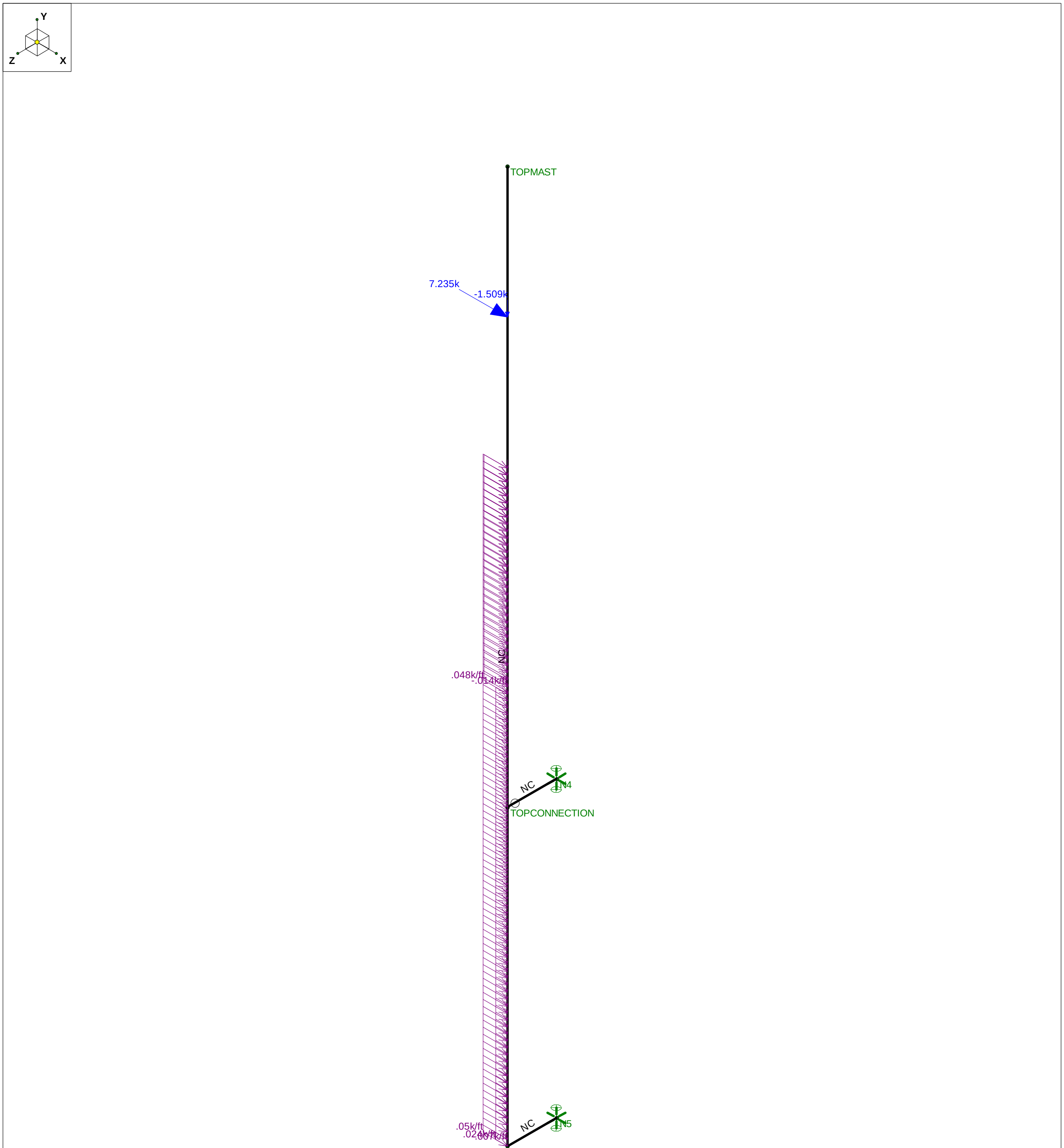






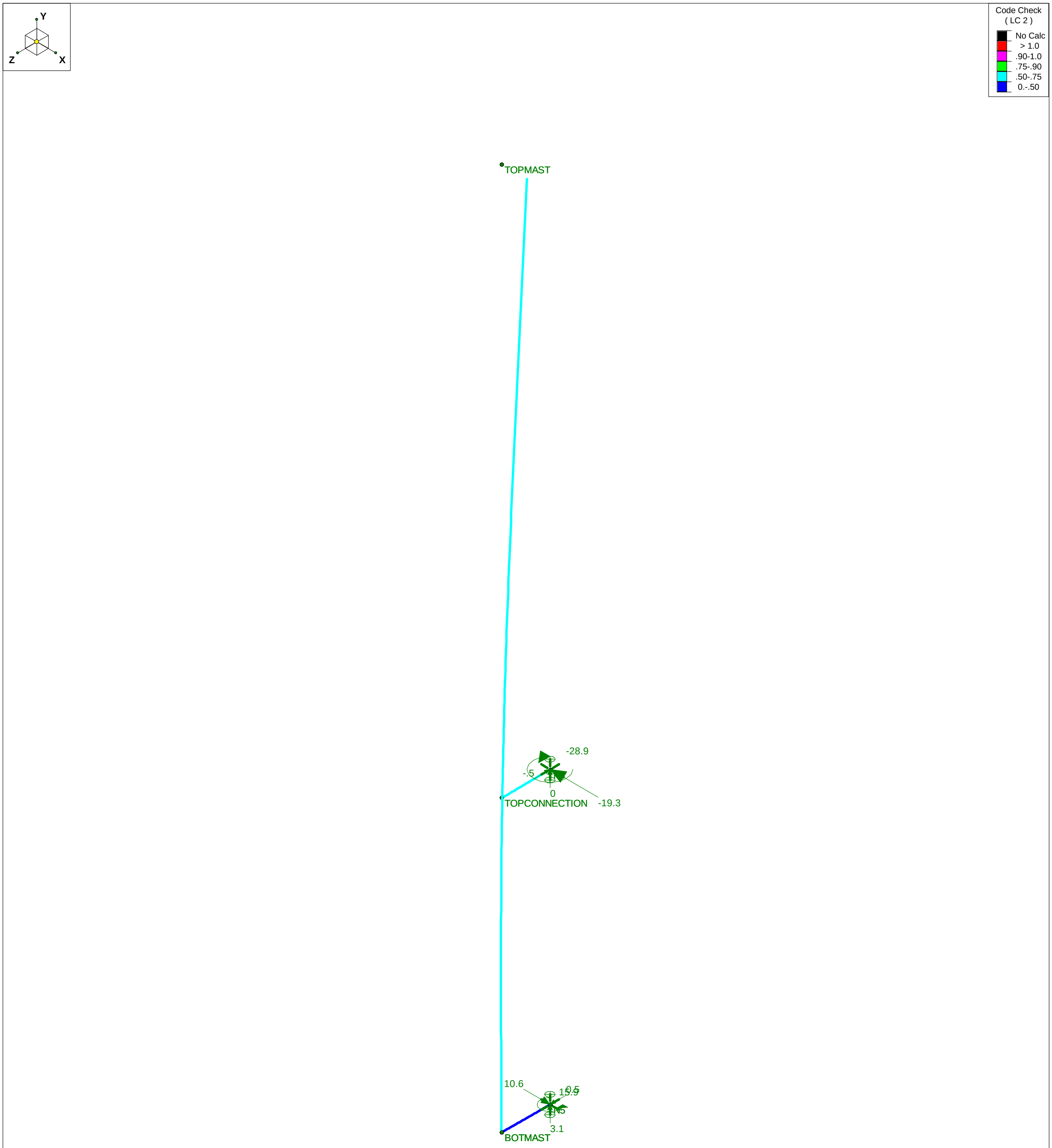
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:12 AM
18058.43	LC #1 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d



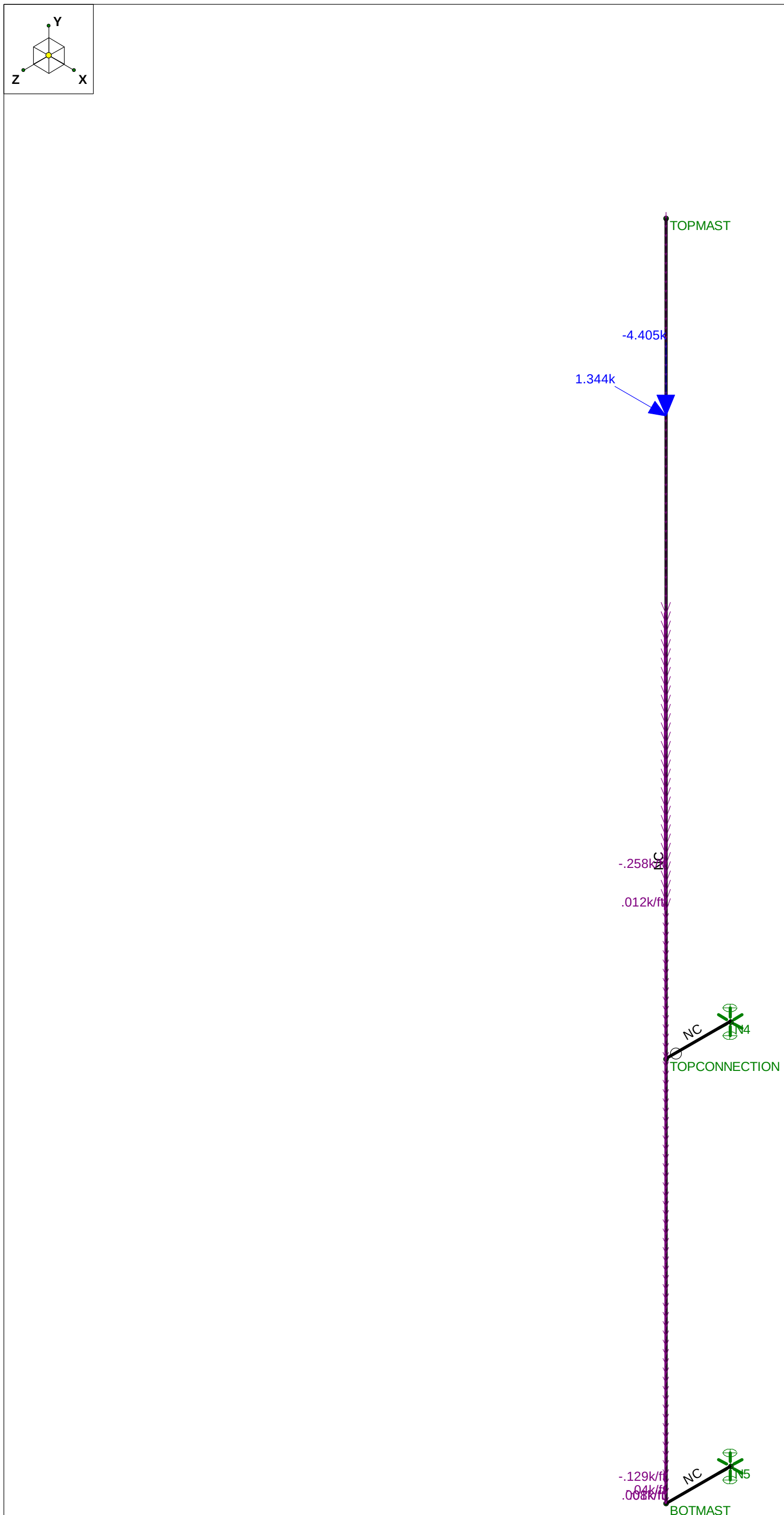
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W (X-direction)

Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:10 AM
18058.43	LC #2 Loads	T-Mobile Antenna Mast - TIA.r3d



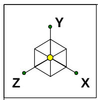
Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

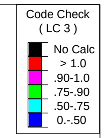
Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:13 AM
18058.43	LC #2 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d

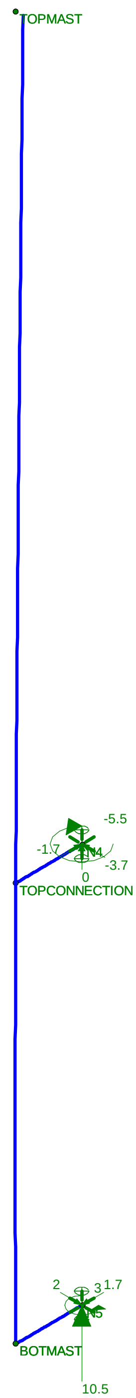


Member Code Checks Displayed
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:11 AM
18058.43	LC #3 Loads	T-Mobile Antenna Mast - TIA.r3d

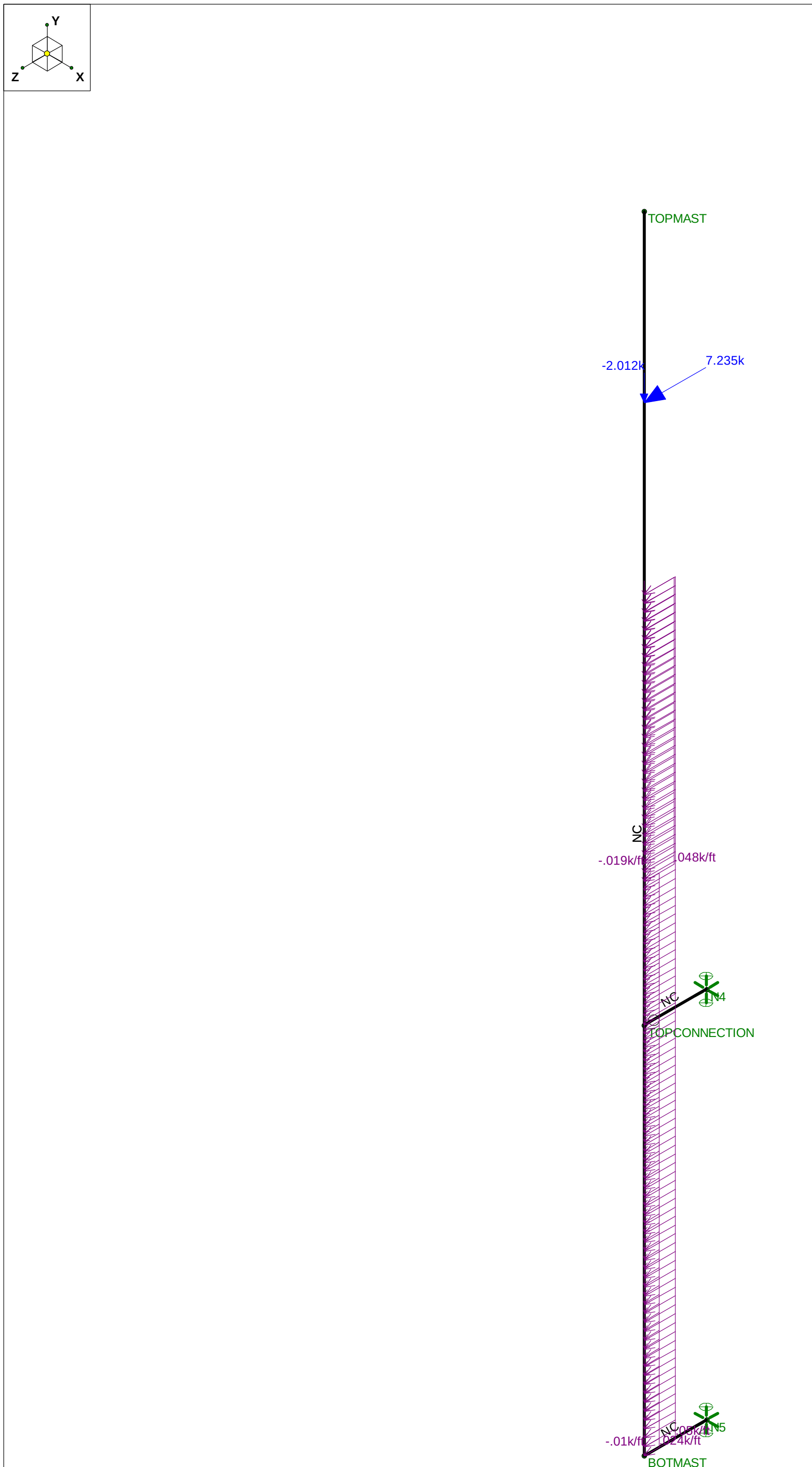






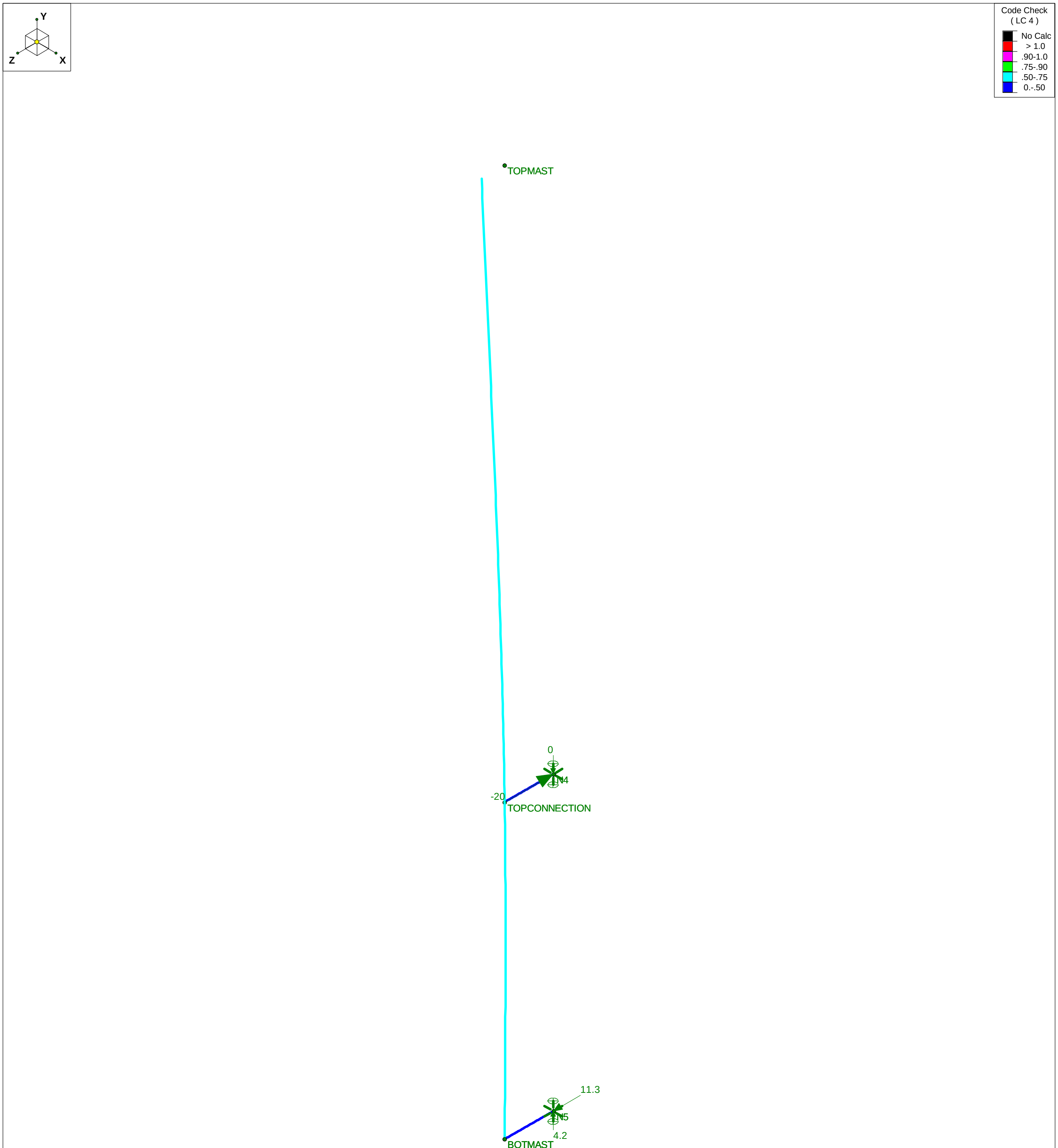
Member Code Checks Displayed
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:13 AM
18058.43	LC #3 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d



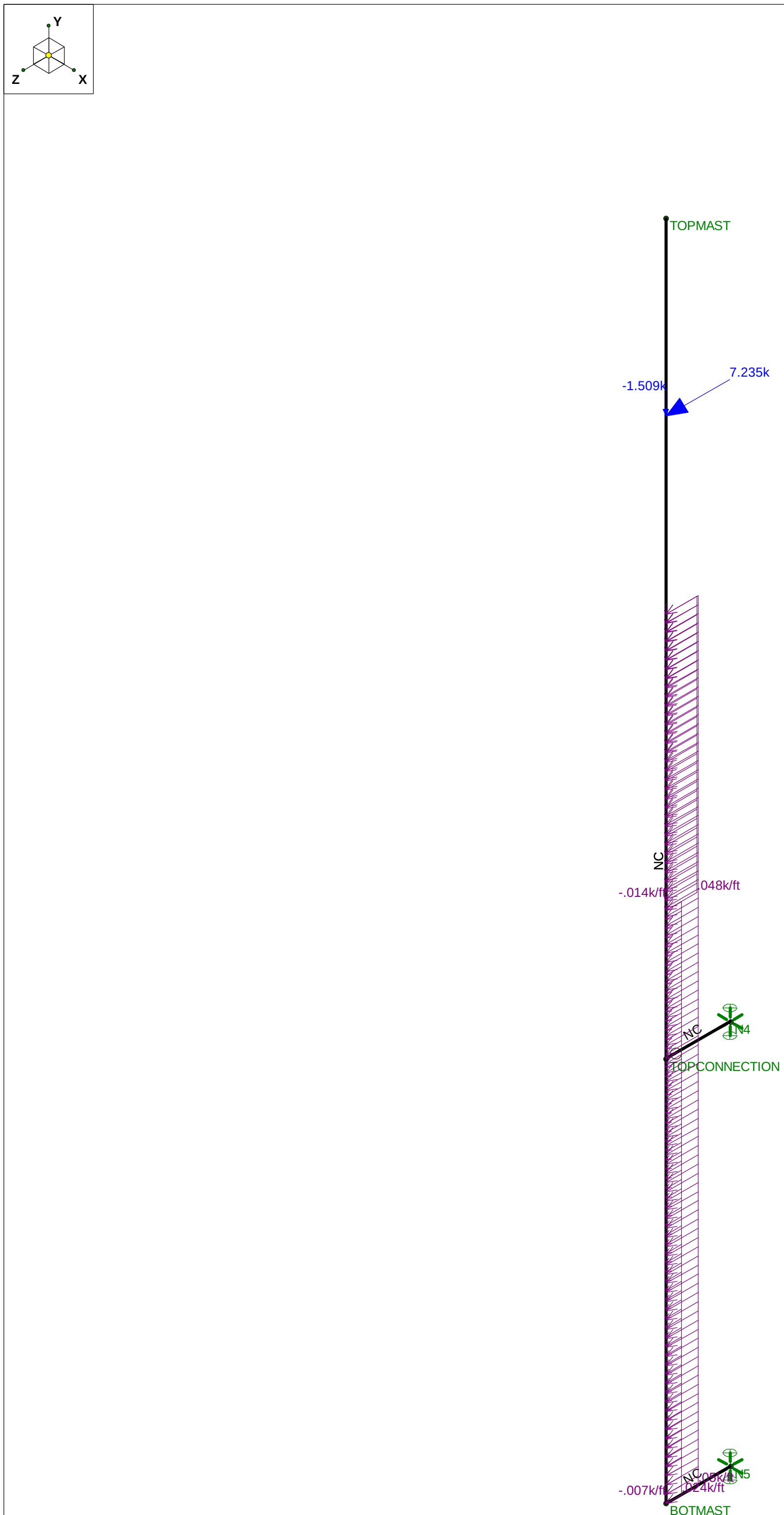
Member Code Checks Displayed
Loads: LC 4, 1.2D + 1.6W (Z-direction)

Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:11 AM
18058.43	LC #4 Loads	T-Mobile Antenna Mast - TIA.r3d



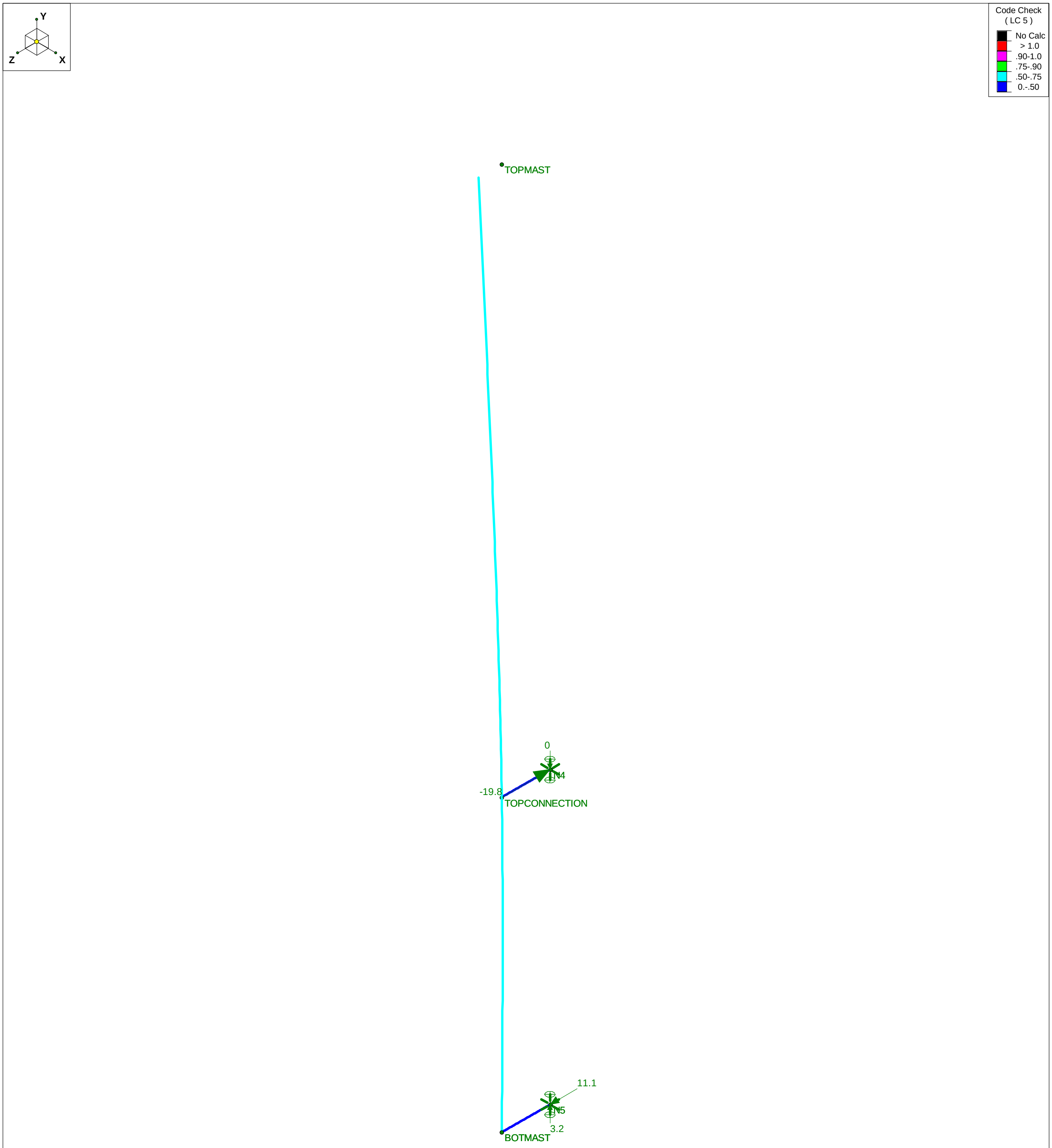
Member Code Checks Displayed
Results for LC 4, 1.2D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:13 AM
18058.43	LC #4 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d



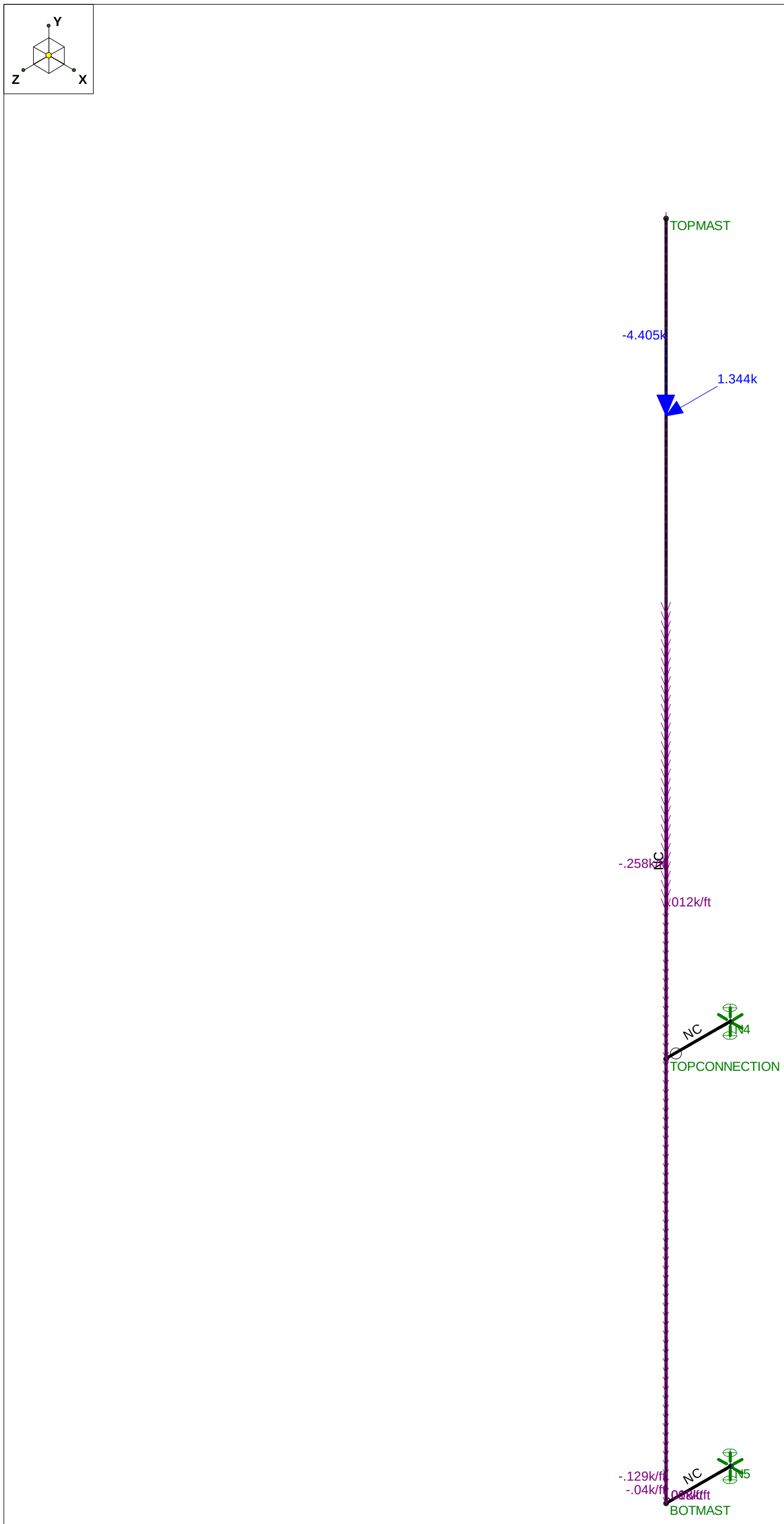
Member Code Checks Displayed
Loads: LC 5, 0.9D + 1.6W (Z-direction)

Centek	Pole # 845 - T-Mobile Mast	
TJL		Feb 12, 2019 at 8:11 AM
18058.43	LC #5 Loads	T-Mobile Antenna Mast - TIA.r3d



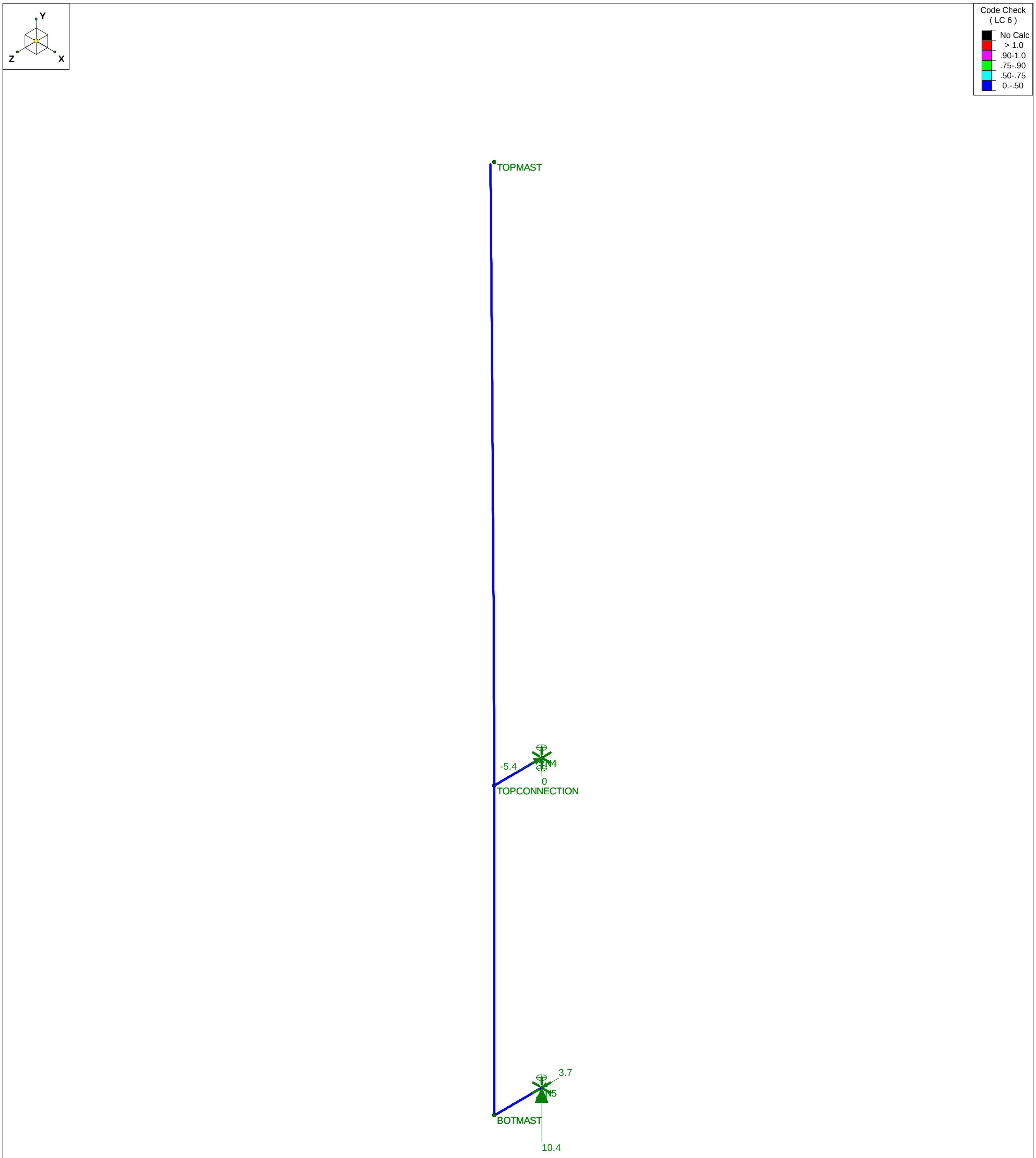
Member Code Checks Displayed
Results for LC 5, 0.9D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:14 AM
18058.43	LC #5 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d



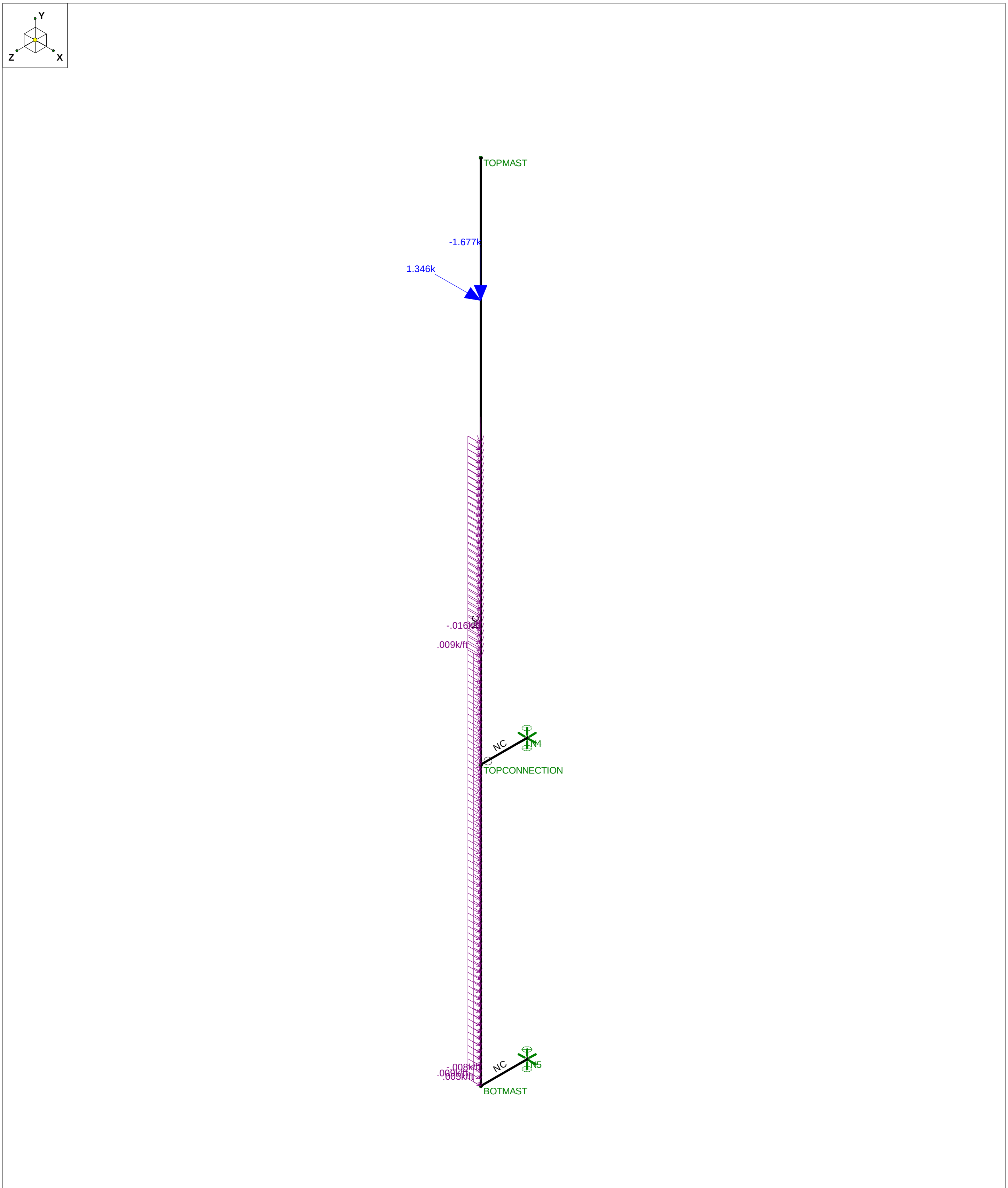
Member Code Checks Displayed
Loads: LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:11 AM
18058.43	LC #6 Loads	T-Mobile Antenna Mast - TIA.r3d



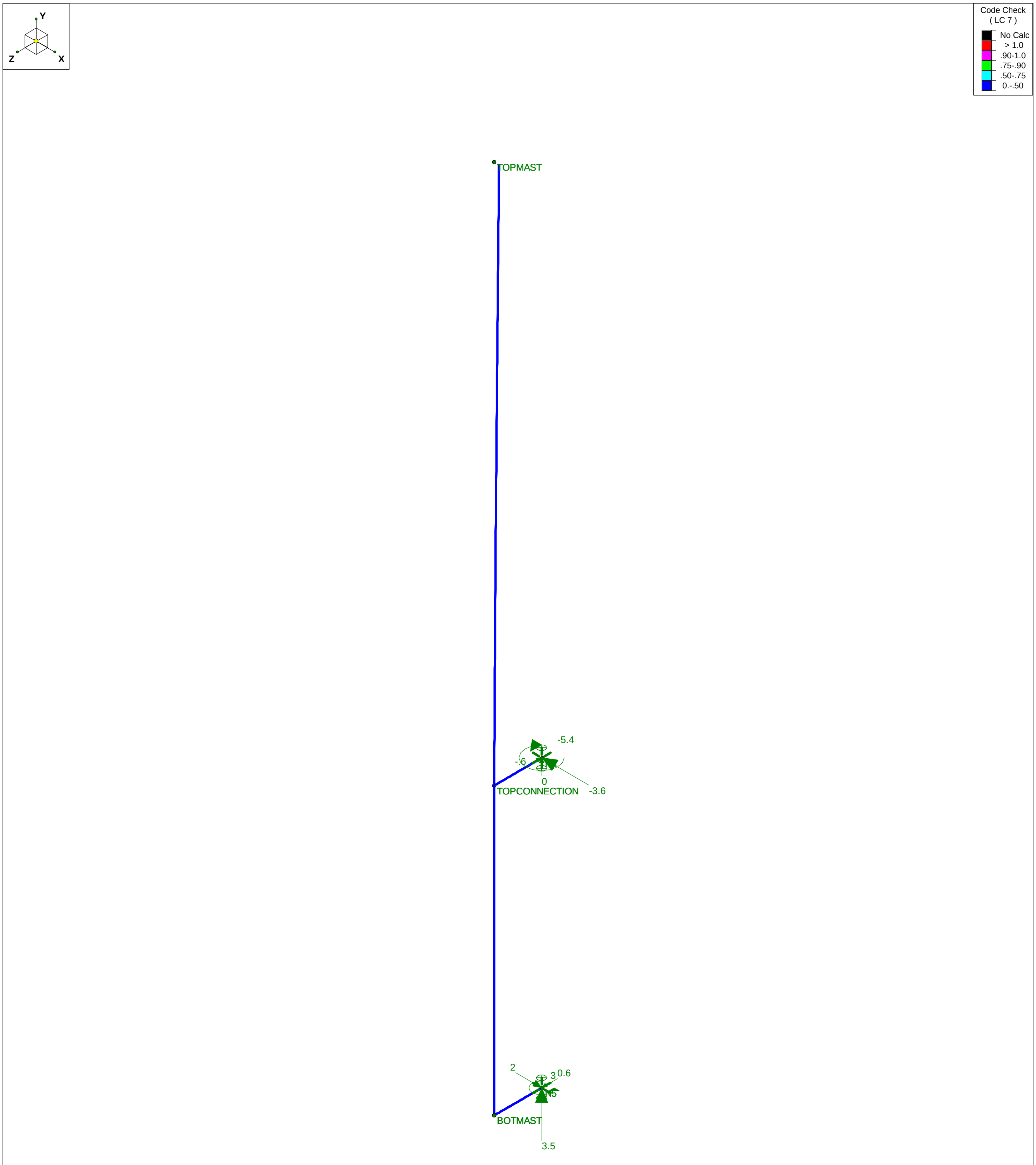
Member Code Checks Displayed
Results for LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:14 AM
18058.43	LC #6 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d



Member Code Checks Displayed
Loads: LC 7, 1.0D + 1.0WService

Centek	Pole # 845 - T-Mobile Mast LC #7 Loads	
TJL		Feb 12, 2019 at 8:11 AM
18058.43		T-Mobile Antenna Mast - TIA.r3d

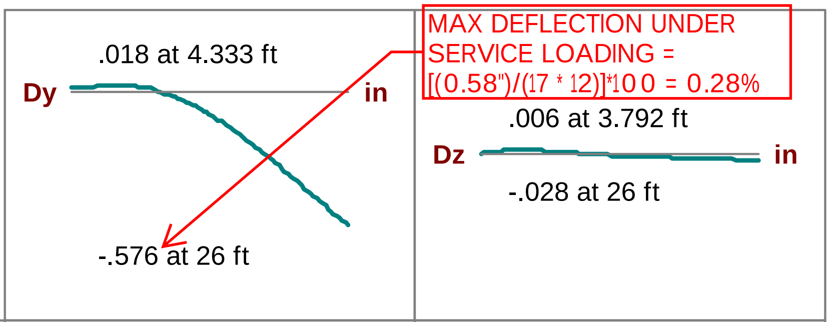


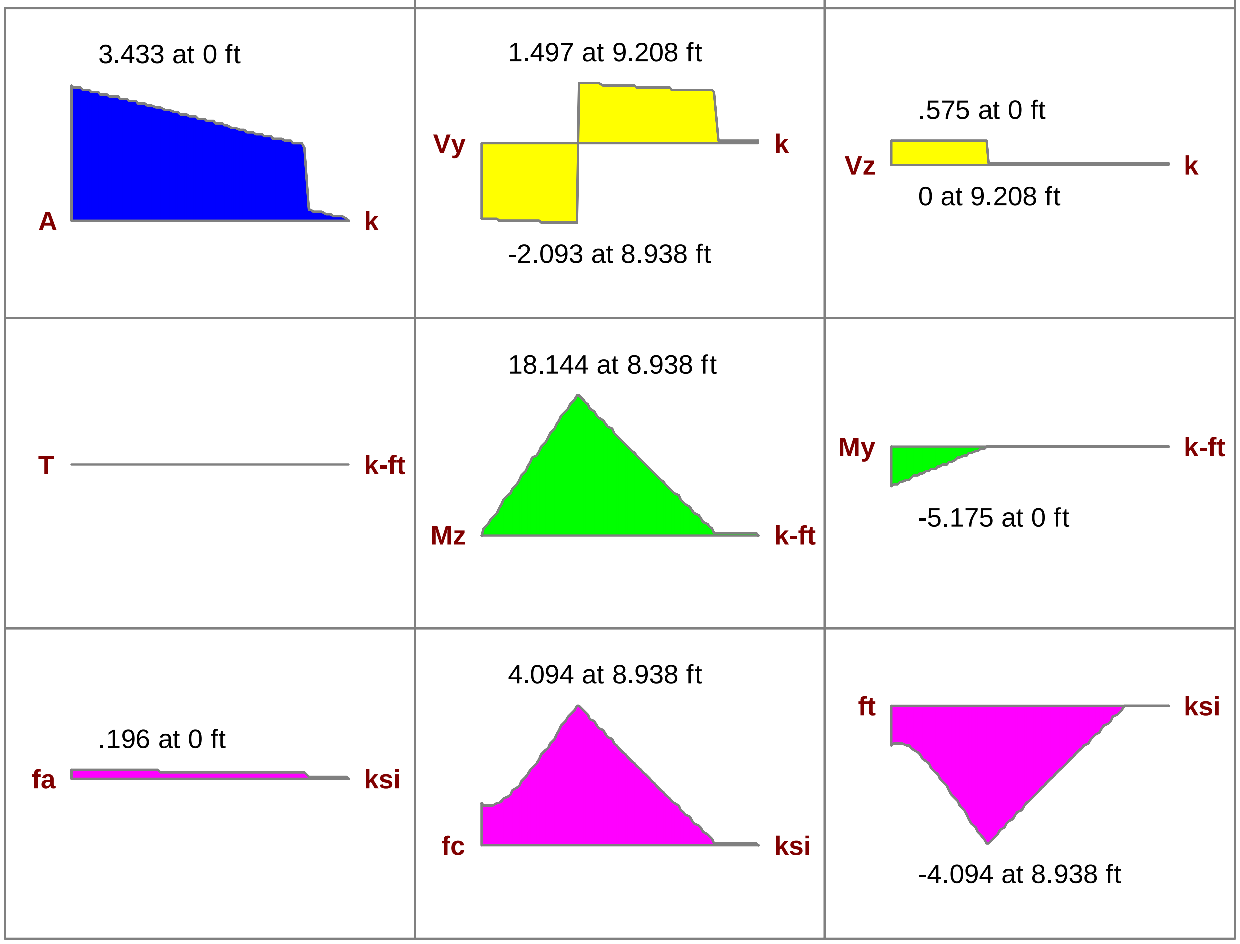
Member Code Checks Displayed
Results for LC 7, 1.0D + 1.0WService
Reaction and Moment Units are k and k-ft

Centek		
TJL	Pole # 845 - T-Mobile Mast	Feb 12, 2019 at 8:15 AM
18058.43	LC #7 Reactions and Deflected Shape	T-Mobile Antenna Mast - TIA.r3d

Column: ***M1***

Shape: **PIPE_12.0X**
Material: **A53 Gr. B**
Length: **26 ft**
I Joint: **BOTMAST**
J Joint: **TOPMAST**
LC 7: 1.0D + 1.0WService
Code Check: **0.102 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.102**	Max Shear Check	**0.013 (s)**
Location	**8.938 ft**	Location	**8.938 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/535**
Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**26 ft**	**26 ft**
phi*Pnc	**426.235 k**	KL/r	**70.888**	**70.888**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**26 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**26 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**1.571**			

Antenna Mast Connection:

Anchor Data:

3/4" Diameter A325 Bolt

Number of Bolts =	$N := 8$	(User Input)
Spacing X =	$S_x := 10.5 \cdot in$	(User Input)
Spacing Y =	$S_y := 8.5 \cdot in$	(User Input)
Design Tension Strength =	$\phi F_{nt} := 29.8 \cdot kips$	(User Input)
Design Shear Strength =	$\phi F_{nv} := 17.9 \cdot kips$	(User Input)

Plate Data:

Plate Width =	$W_{plt} := 14 \cdot in$	(User Input)
Plate Thickness =	$t_{plt} := 1 \cdot in$	(User Input)
Distance from Bolt to Collar =	$d_{st} := 2.25 \cdot in$	(User Input)
Yield Strength =	$Fy := 36 \cdot ksi$	(User Input)

Design Reactions: Wind X-Direction

Force Y =	$F_y := 0 \cdot kips$	(User Input)
Force X =	$F_x := 19.31 \cdot kips$	(User Input)
Force Z =	$F_z := 0.69 \cdot kips$	(User Input)
Moment X =	$Mx := 0 \cdot ft \cdot kips$	(User Input)
Moment Y =	$My := 28.95 \cdot ft \cdot kips$	(User Input)
Moment Z =	$Mz := 0 \cdot ft \cdot kips$	(User Input)

Anchor Check:

Max Tension Force =

$$T_{Max} := \frac{F_z}{N} + \frac{Mx}{S_y \cdot \frac{N}{2}} + \frac{My}{S_x \cdot \frac{N}{2}} = 8.36 \cdot kips$$

Max Shear Force =

$$V_{Max} := \frac{F_x + F_y}{N} + \frac{Mz}{S_x \cdot \frac{N}{2}} = 2.41 \cdot kips$$

Condition 1 =

$$Condition1 := if\left(\frac{T_{Max}}{\phi F_{nt}} \le 1.00, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$$

Condition 2 =

$$Condition2 := if\left(\frac{V_{Max}}{\phi F_{nv}} \le 1.00, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$$

Condition 3 =

$$Condition3 := if\left(\frac{T_{Max}}{\phi F_{nt}} + \frac{V_{Max}}{\phi F_{nv}} \le 1.0, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$$

% of Capacity =

$$\max\left[\frac{T_{Max}}{\phi F_{nt}}, \frac{V_{Max}}{\phi F_{nv}}, \left(\frac{\frac{T_{Max}}{\phi F_{nt}} + \frac{V_{Max}}{\phi F_{nv}}}{1.0}\right)\right] = 41.5 \cdot \%$$

Check Plate:

Design Bending Strength = $F_b := 0.9Fy = 32.4 \cdot ksi$

Plate Section Modulus = $Z_{plt} := \frac{1}{4} \cdot W_{plt} \cdot t_{plt}^{\ 2} = 3.5 \cdot in^3$

Plate Bending Moment = $M := \frac{T_{Max} \cdot N}{2} \cdot d_{st} = 75.219 \cdot in \cdot kips$

Plate Bending Stress = $f_b := \frac{M}{Z_{plt}} = 21.491 \cdot ksi$

Plate_Bending := if$\left(f_b < F_b, \text{"OK"}, \text{"Overstressed"}\right)$

Plate_Bending = "OK"

Design Reactions: Wind Z-Direction

Force Y =	$F_y := 0.01 \cdot kips$	(User Input)
Force X =	$F_x := 0 \cdot kips$	(User Input)
Force Z =	$F_z := 20 \cdot kips$	(User Input)
Moment X =	$Mx := 0 \cdot ft \cdot kips$	(User Input)
Moment Y =	$My := 0 \cdot ft \cdot kips$	(User Input)
Moment Z =	$Mz := 0 \cdot ft \cdot kips$	(User Input)

Anchor Check:

Max Tension Force = $T_{Max} := \frac{F_z}{N} + \frac{Mx}{S_y \cdot \frac{N}{2}} + \frac{My}{S_x \cdot \frac{N}{2}} = 2.5 \cdot kips$

Max Shear Force = $V_{Max} := \frac{F_x + F_y}{N} + \frac{Mz}{S_x \cdot \frac{N}{2}} = 1.25 \times 10^{-3} \cdot kips$

Condition 1 = $\text{Condition1} := \text{if}\left(\frac{T_{Max}}{\phi F_{nt}} \le 1.00, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$

Condition 2 = $\text{Condition2} := \text{if}\left(\frac{V_{Max}}{\phi F_{nv}} \le 1.00, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$

Condition 3 = $\text{Condition3} := \text{if}\left(\frac{T_{Max}}{\phi F_{nt}} + \frac{V_{Max}}{\phi F_{nv}} \le 1.0, \text{"OK"}, \text{"NG"}\right) = \text{"OK"}$

% of Capacity = $\max\left[\frac{T_{Max}}{\phi F_{nt}}, \frac{V_{Max}}{\phi F_{nv}}, \left(\frac{\frac{T_{Max}}{\phi F_{nt}} + \frac{V_{Max}}{\phi F_{nv}}}{1.0}\right)\right] = 8.4 \cdot \%$

Check Plate:

Design Bending Strength = $F_b := 0.9Fy = 32.4 \cdot ksi$

Plate Section Modulus = $Z_{plt} := \frac{1}{4} \cdot W_{plt} \cdot t_{plt}^{\ 2} = 3.5 \cdot in^3$

Plate Bending Moment = $M := \frac{T_{Max} \cdot N}{2} \cdot d_{st} = 22.5 \cdot in \cdot kips$

Plate Bending Stress = $f_b := \frac{M}{Z_{plt}} = 6.429 \cdot ksi$

Plate_Bending := if($f_b < F_b$, "OK" , "Overstressed")

Plate_Bending = "OK"

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 163$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $$Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.403$$ (NESC 2007 Table 250-2)

Exposure Factor = $$Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.292$$ (NESC 2007 Table 250-3)

Response Term = $$Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.783$$ (NESC 2007 Table 250-3)

Gust Response Factor = $$Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.83$$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36$ psf (NESC 2007 Section 250.C.2)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Wind Loading =	**2.5**	(User Input)
NESC Extreme Wind Loading =	**1.0**	(User Input)
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)

Overload Factors for Vertical Loads:

NESC Heavy Wind Loading =	**1.5**	(User Input)
NESC Extreme Wind Loading =	**1.0**	(User Input)
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)

Development of Wind & Ice Load on Antenna Mast

Antenna Mast Data: (12" Sch. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 26$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\;2}\right] = 20.8$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Wind Load (NESC Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot Ir\right)}{12} = 1.146$ sf/ft

Total Mast Wind Force w/ Ice (Above NU Structure) = $Fi_{mast} := p \cdot Cd_{coax} \cdot AICE_{mast} = 7$ plf **BLC 4**

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.063$ sf/ft

Total Mast Wind Force (Above NU Structure) = $F_{mast} := qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 77$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $F_{mast} := qz \cdot Cd_{coax} \cdot A_{mast} = 61$ plf **BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 123$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1017$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 99$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 5.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 106$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1092$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPXVAARR24_43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 95.9$ in (User Input)

Antenna Width = $W_{ant} := 24$ in (User Input)

Antenna Thickness = $T_{ant} := 8.7$ in (User Input)

Antenna Weight = $WT_{ant} := 154$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 462$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 3474$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 113$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 338$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 16.8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 50.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 323$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 48$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3457$ lbs

Development of Wind & Ice Load on Platform

Platform Data:

Platform Model =	SitePro Double Support Arm RDS-284 (x2)		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 7$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 11$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1080$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1250$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 1080$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 170$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 44$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 315$ lbs

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (138-ft - 150-ftAGL)

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 12$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax} := 12$ (User Input)

No. of Coax Projecting Outside Face of Antenna Mast = $NP_{coax} := 2$ (User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 8$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 15$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 0.3$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 2$ plf **BLC 4**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 0.3$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 19$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 15$ plf **BLC 5**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (150-ft - 160-ft AGL)

Coax Type = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax} := 10$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax} := 24$ (User Input)

No. of Coax Projecting Outside Face of Antenna Mast = $NP_{coax} := 4$ (User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 16$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 30$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot D_{coax} + 2 \cdot Ir}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 4**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 0.5$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 37$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 30$ plf **BLC 5**

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 90$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.238$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.317$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.867$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.879$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 33.7$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members = $Cd_R := 1.3$ (User Input)

Shape Factor for Flat Members = $Cd_F := 1.6$ (User Input)

Shape Factor for Coax Cables Attached to Outside of Pole = $Cd_{coax} := 1.45$ (User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on Mast

Mast Data: (3" Sch. 80 Pipe)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 3.5$	in	(User Input)
Mast Length =	$L_{mast} := 8.5$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.3$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.292$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 13$ plf **BLC 5,7**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.375$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 2$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of the Mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\ 2}\right] = 6.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 2$ plf **BLC 3**

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject:	Load Analysis of Verizon Equipment on Structure #845
	Location:	Trumbull, CT
	Rev. 2: 3/4/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 18058.43

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = SBNHH-1D65B

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 11.9$ in (User Input)

Antenna Thickness = $T_{ant} := 7.1$ in (User Input)

Antenna Weight = $WT_{ant} := 45$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input) (One per pipe mast / tot. of 3)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 6$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} = 321$ lbs **BLC 5,7**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 45$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6083$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1544$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 50$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Alcatel-Lucent B13 RRH4x30/2x60-LTE			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 21.6$	in	(User Input)	
Antenna Width =	$W_{ant} := 12$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 9$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 57$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 1$		(User Input)	(One per pipe mast / tot. of 3)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 1.4$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} = 73$ lbs **BLC 5,7**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (T_{ant} + 1)}{144} = 1.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 10$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 57$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2333$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 605$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 20$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 20$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Alcatel-Lucent RRH4x45/2x90-AWS			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 25.8$	in	(User Input)	
Antenna Width =	$W_{ant} := 12$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 7.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 72$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 1$		(User Input)	(One per pipe mast / tot. of 3)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 1.4$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} = 73$ lbs **BLC 5,7**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (T_{ant} + 1)}{144} = 1.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 10$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 72$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2353$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 643$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 21$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 21$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS DB-T1-6Z-8AB-0Z		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 24$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 4$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} = 216$ lbs **BLC 5,7**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant}+1)\cdot(W_{ant}+1)}{144} = 4.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 28$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 45$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5760$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant}+1)(W_{ant}+1)\cdot(T_{ant}+1) - V_{ant} = 1115$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 36$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 36$ lbs **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Standard Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast-new	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678
2	Outrigger	HSS6X6X5	Beam	Wide Flange	A500 Gr.46	Typical	6.43	34.3	34.3	55.4

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Mast-new	26			Lbyy									Lateral
2	M2	Outrigger	1.5			Lbyy									Lateral
3	M3	Outrigger	1.5			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOT-MA...	TOP-MA...			Mast-new	Column	Pipe	A53 Gr. B	Typical
2	M2	TOP-BR...	N4			Outrigger	Beam	Wide Flange	A500 Gr....	Typical
3	M3	BOT-MA...	N5			Outrigger	Beam	Wide Flange	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	TOP-BRACE	0	9	0	0	
2	TOP-MAST	0	26	0	0	
3	BOT-MAST	0	0	0	0	
4	N4	0	9	-1.5	0	
5	N5	0	0	-1.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	TOP-BRACE						
2	BOT-MAST						
3	N4	Reaction	Reaction	Reaction		Reaction	
4	N5	Reaction	Reaction	Reaction		Reaction	

Member Point Loads (BLC 2 : Weight of Equipment)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.123	22
2	M1	Y	-.462	22
3	M1	Y	-1.08	22

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.099	22
2	M1	Y	-.338	22
3	M1	Y	-.17	22

Member Point Loads (BLC 4 : NESC Heavy Wind X-Dir)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 4 : NESC Heavy Wind X-Dir) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.106	22
2	M1	X	.323	22
3	M1	X	.044	22

Member Point Loads (BLC 5 : NESC Extreme Wind X-Dir)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.092	22
2	M1	X	3.457	22
3	M1	X	.315	22

Member Point Loads (BLC 6 : NESC Heavy Wind Z-Dir)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.106	22
2	M1	Z	.323	22
3	M1	Z	.044	22

Member Point Loads (BLC 7 : NESC Extreme Wind Z-Dir)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	1.092	22
2	M1	Z	3.457	22
3	M1	Z	.315	22

Member Distributed Loads (BLC 2 : Weight of Equipment)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	12
2	M1	Y	-.016	-.016	12	18

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.015	-.015	0	12
3	M1	Y	-.03	-.03	12	18

Member Distributed Loads (BLC 4 : NESC Heavy Wind X-Dir)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	18
2	M1	X	.002	.002	0	12
3	M1	X	.004	.004	12	18

Member Distributed Loads (BLC 5 : NESC Extreme Wind X-Dir)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.061	.061	0	12
2	M1	X	.077	.077	12	18
3	M1	X	.015	.015	0	12
4	M1	X	.037	.037	12	18

Member Distributed Loads (BLC 6 : NESC Heavy Wind Z-Dir)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.007	.007	0	18
2	M1	Z	.002	.002	0	12
3	M1	Z	.004	.004	12	18

Member Distributed Loads (BLC 7 : NESC Extreme Wind Z-Dir)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.061	.061	0	12
2	M1	Z	.077	.077	12	18
3	M1	Z	.015	.015	0	12
4	M1	Z	.037	.037	12	18

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (Mast)	None		-1						
2	Weight of Equipment	None					3	2		
3	Weight of Ice Only	None					3	3		
4	NESC Heavy Wind X-Dir	None					3	3		
5	NESC Extreme Wind X-Dir	None					3	4		
6	NESC Heavy Wind Z-Dir	None					3	3		
7	NESC Extreme Wind Z-Dir	None					3	4		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	NESC Heavy Wind X-Dir	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind X-...	Yes	Y		1	1	2	1	5	1														
3	NESC Heavy Wind Z-Dir	Yes	Y		1	1.5	2	1.5	3	1.5	6	2.5												
4	NESC Extreme Wind Z-...	Yes	Y		1	1	2	1	7	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N4	max	0	4	.03	3	-.573	2	0	4	0	4	0	4
2		min	-13.661	2	.008	4	-14.232	4	0	1	-20.49	2	0	1
3	N5	max	7.201	2	6.943	1	7.772	4	0	4	10.802	2	0	4
4		min	0	3	3.454	2	.573	2	0	1	0	3	0	1
5	Totals:	max	0	4	6.969	3	0	2						
6		min	-6.46	2	3.471	2	-6.46	4						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N4	-3.357	.026	-1.152	0	-5.035	0
2	1	N5	1.739	6.943	1.152	0	2.61	0
3	1	Totals:	-1.618	6.969	0			
4	1	COG (ft):	X: 0	Y: 16.984	Z: -.011			

Joint Reactions

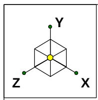
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N4	-13.661	.017	-.573	0	-20.49	0
2	2	N5	7.201	3.454	.573	0	10.802	0
3	2	Totals:	-6.46	3.471	0			
4	2	COG (ft):	X: 0	Y: 17.018	Z: -.014			

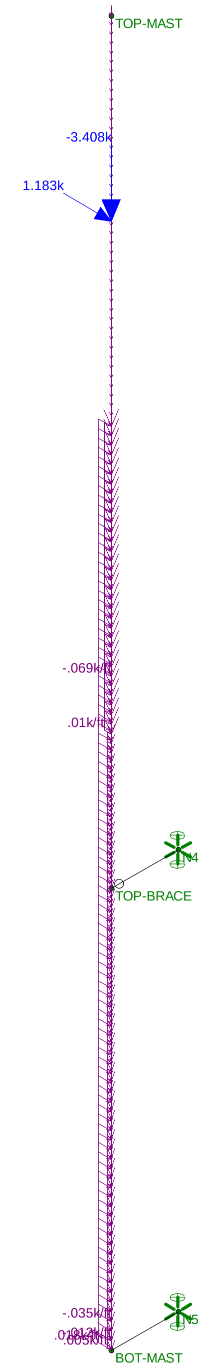
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N4	0	.03	-4.507	0	0	0
2	3	N5	0	6.939	2.89	0	0	0
3	3	Totals:	0	6.969	-1.617			
4	3	COG (ft):	X: 0	Y: 16.984	Z: -.011			

Joint Reactions

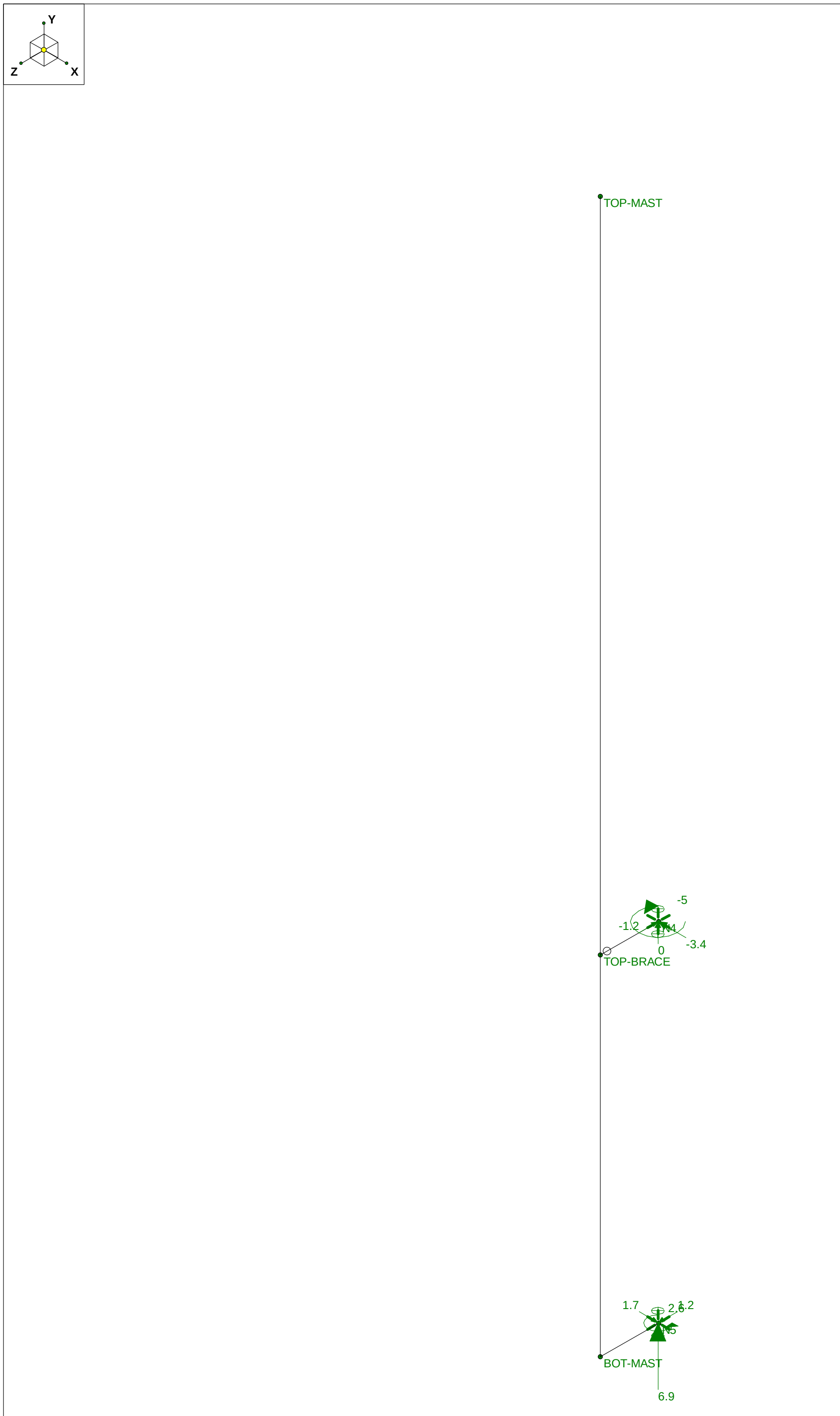
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N4	0	.008	-14.232	0	0	0
2	4	N5	0	3.463	7.772	0	0	0
3	4	Totals:	0	3.471	-6.46			
4	4	COG (ft):	X: 0	Y: 17.018	Z: -.014			





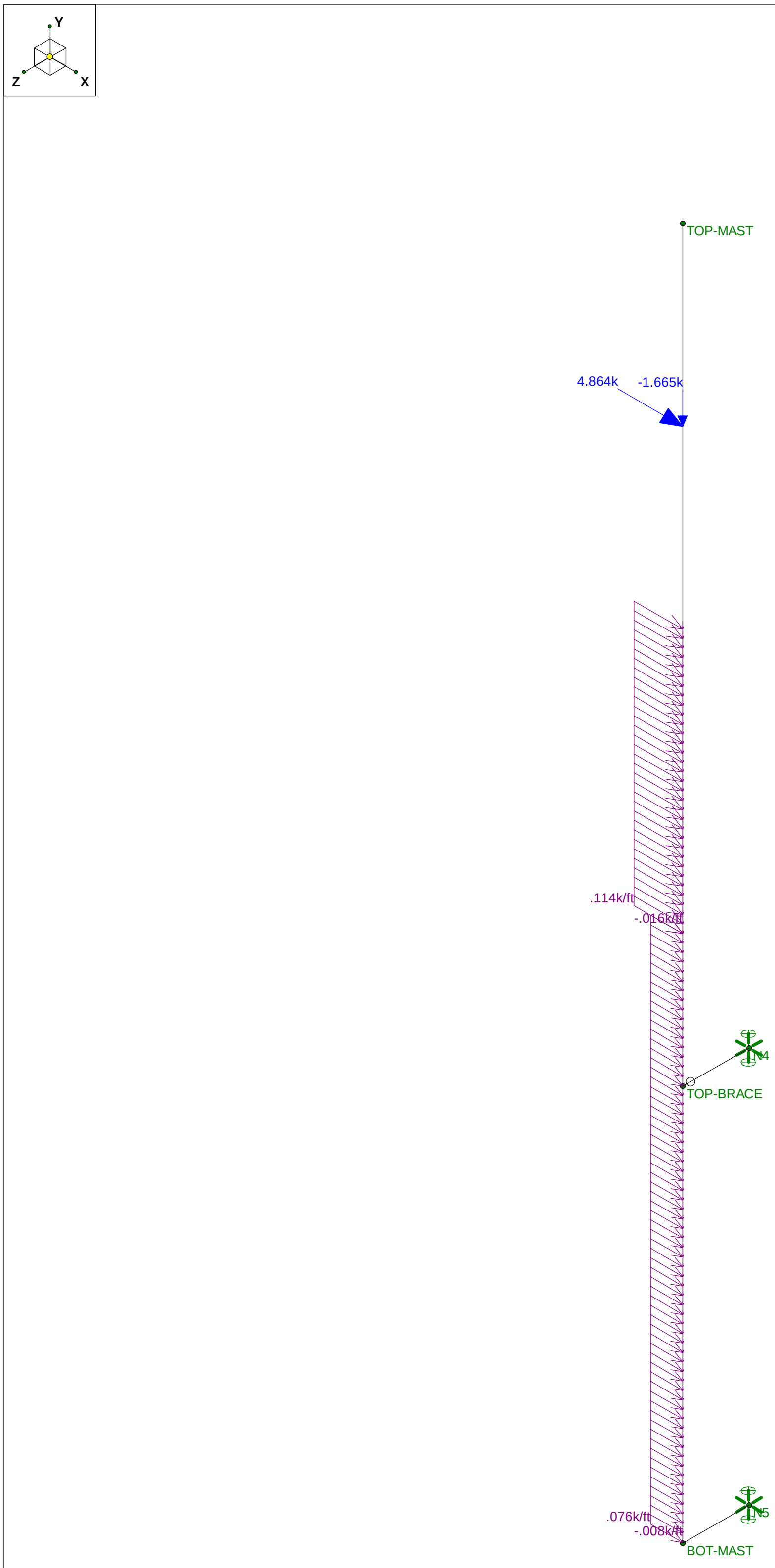
Loads: LC 1, NESC Heavy Wind X-Dir

Centek	Pole # 845 - T-Mobile Mast	
TJL	LC #1 Loads	Mar 4, 2019 at 1:20 PM
18058.43		T-Mobile Antenna Mast - NESC.r3d



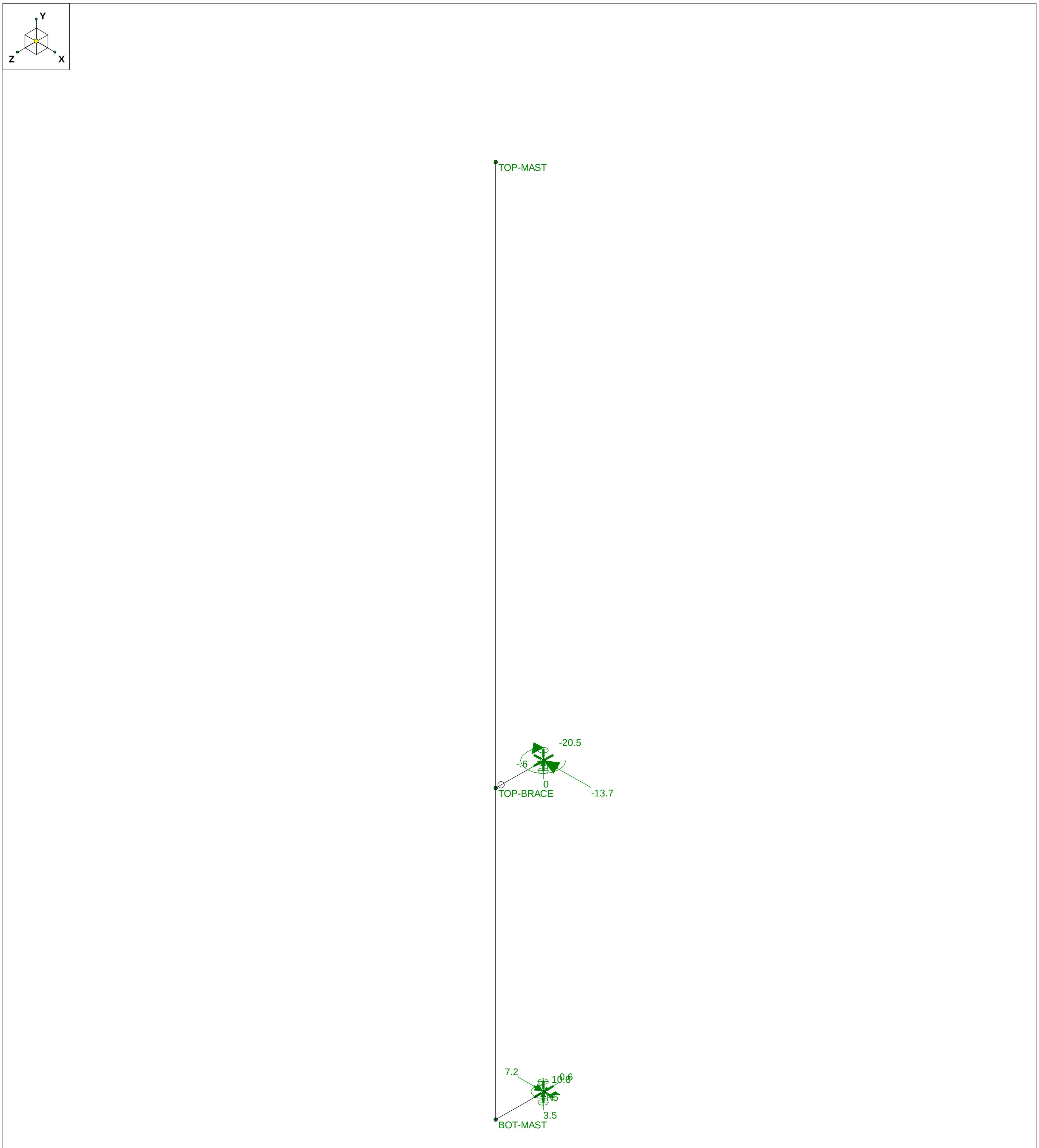
Results for LC 1, NESC Heavy Wind X-Dir
Reaction and Moment Units are k and k-ft

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:21 PM
18058.43	LC #1 Reactions	T-Mobile Antenna Mast - NESC.r3d



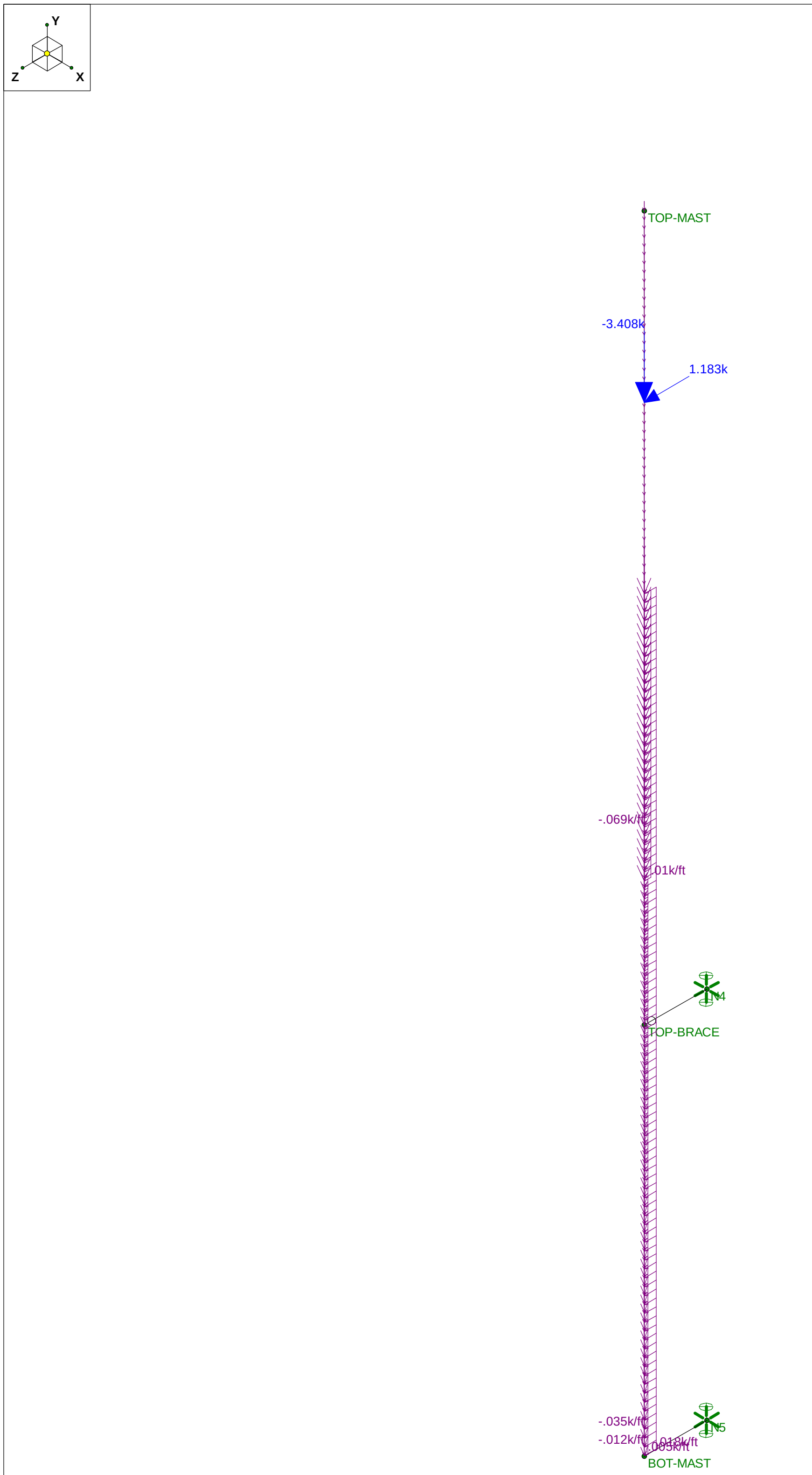
Loads: LC 2, NESC Extreme Wind X-Dir

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:20 PM
18058.43	LC #2 Loads	T-Mobile Antenna Mast - NESC.r3d



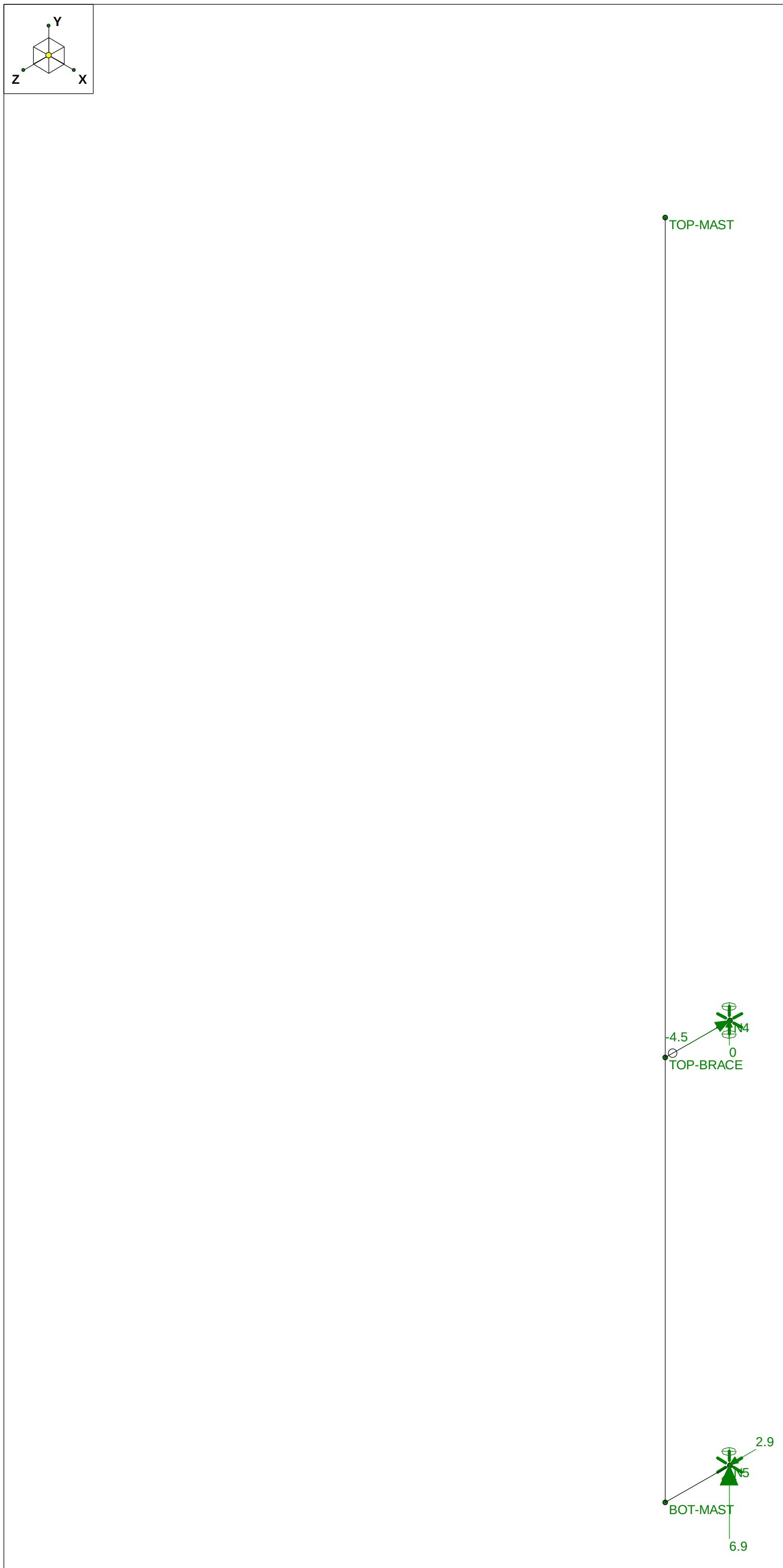
Results for LC 2, NESC Extreme Wind X-Dir
Reaction and Moment Units are k and k-ft

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:21 PM
18058.43	LC #2 Reactions	T-Mobile Antenna Mast - NESC.r3d



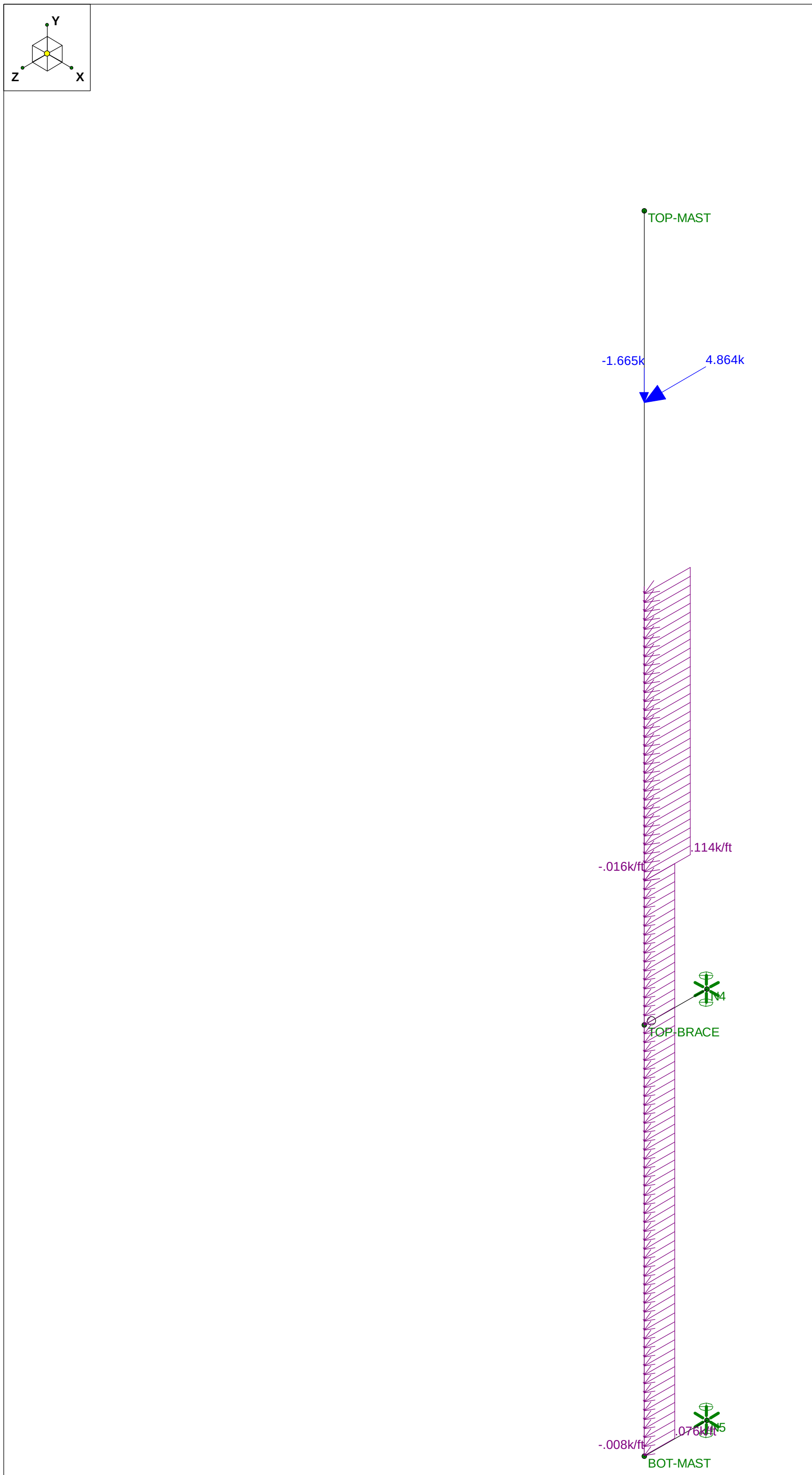
Loads: LC 3, NESC Heavy Wind Z-Dir

Centek	Pole # 845 - T-Mobile Mast	
TJL	LC #3 Loads	Mar 4, 2019 at 1:20 PM
18058.43		T-Mobile Antenna Mast - NESC.r3d



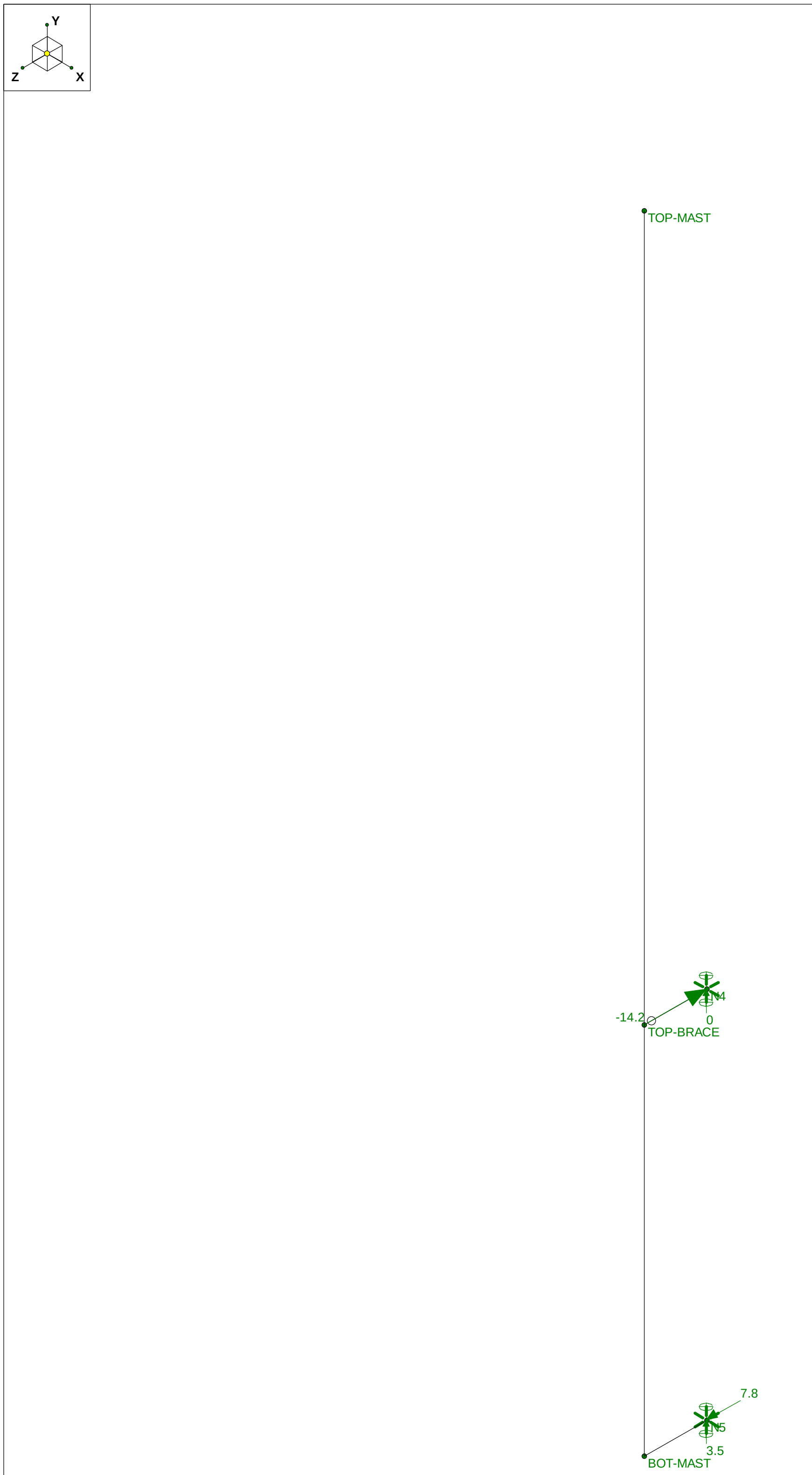
Results for LC 3, NESC Heavy Wind Z-Dir
Reaction and Moment Units are k and k-ft

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:22 PM
18058.43	LC #3 Reactions	T-Mobile Antenna Mast - NESC.r3d



Loads: LC 4, NESC Extreme Wind Z-Dir

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:20 PM
18058.43	LC #4 Loads	T-Mobile Antenna Mast - NESC.r3d



Results for LC 4, NESC Extreme Wind Z-Dir
Reaction and Moment Units are k and k-ft

Centek	Pole # 845 - T-Mobile Mast	
TJL		Mar 4, 2019 at 1:22 PM
18058.43	LC #4 Reactions	T-Mobile Antenna Mast - NESC.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz Mast	PIPE_3.0X	Beam	Pipe	A53 Gr. B	Typical	2.83	3.7	3.7	7.4
2	Pipe Mast	PIPE_2.0	Column	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
3	Outrigger	HSS4X4X4	Beam	Tube	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
4	Plate	6"X3/4" PL	Beam	Tube	A36 Gr.36	Typical	4.5	.211	13.5	.777

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Outrigger	1			Lbyy									Lateral
2	M2	Horz Mast	8.5			Lbyy									Lateral
3	M3	Plate	2			Lbyy									Lateral
4	M4	Pipe Mast	6			Lbyy									Lateral
5	M5	Pipe Mast	6			Lbyy									Lateral
6	M6	Pipe Mast	6			Lbyy									Lateral
7	M7	Pipe Mast	6			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N3	N4			Outrigger	Beam	Tube	A500 Gr....	Typical
2	M2	N5	N9			Horz Mast	Beam	Pipe	A53 Gr. B	Typical
3	M3	N2	N1			Plate	Beam	Tube	A36 Gr.36	Typical
4	M4	N10	N11			Pipe Mast	Column	Pipe	A53 Gr. B	Typical
5	M5	N12	N13			Pipe Mast	Column	Pipe	A53 Gr. B	Typical
6	M6	N14	N15			Pipe Mast	Column	Pipe	A53 Gr. B	Typical
7	M7	N16	N17			Pipe Mast	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	1	0	0	0	
2	N2	-1	0	0	0	
3	N3	0	0	0	0	
4	N4	0	0	1	0	
5	N5	-4.5	0	1	0	
6	N6	-4	0	1	0	
7	N7	-2	0	1	0	
8	N8	2	0	1	0	
9	N9	4	0	1	0	
10	N10	-4	3	1	0	
11	N11	-4	-3	1	0	
12	N12	-2	3	1	0	
13	N13	-2	-3	1	0	
14	N14	2	3	1	0	
15	N15	2	-3	1	0	
16	N16	4	3	1	0	
17	N17	4	-3	1	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction	Reaction		
2	N1	Reaction	Reaction	Reaction	Reaction		

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Y	-.022	.5
2	M5	Y	-.022	.5
3	M7	Y	-.022	.5
4	M4	Y	-.022	5.5
5	M5	Y	-.022	5.5
6	M7	Y	-.022	5.5
7	M4	Y	-.057	1
8	M5	Y	-.057	1
9	M7	Y	-.057	1
10	M4	Y	-.072	5
11	M5	Y	-.072	5
12	M7	Y	-.072	5
13	M6	Y	-.045	2

Member Point Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Y	-.025	.5
2	M5	Y	-.025	.5
3	M7	Y	-.025	.5
4	M4	Y	-.025	5.5
5	M5	Y	-.025	5.5
6	M7	Y	-.025	5.5
7	M4	Y	-.02	1
8	M5	Y	-.02	1
9	M7	Y	-.02	1
10	M4	Y	-.021	5
11	M5	Y	-.021	5
12	M7	Y	-.021	5
13	M6	Y	-.036	2

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	X	.021	.5
2	M5	X	.021	.5
3	M7	X	.021	.5
4	M4	X	.021	5.5
5	M5	X	.021	5.5
6	M7	X	.021	5.5
7	M4	X	.01	1
8	M5	X	.01	1
9	M7	X	.01	1
10	M4	X	.01	5
11	M5	X	.01	5

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
12	M7	X	.01	5
13	M6	X	.028	2

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	X	.161	.5
2	M5	X	.161	.5
3	M7	X	.161	.5
4	M4	X	.161	5.5
5	M5	X	.161	5.5
6	M7	X	.161	5.5
7	M4	X	.073	1
8	M5	X	.073	1
9	M7	X	.073	1
10	M4	X	.073	5
11	M5	X	.073	5
12	M7	X	.073	5
13	M6	X	.216	2

Member Point Loads (BLC 6 : z-dir NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Z	.021	.5
2	M5	Z	.021	.5
3	M7	Z	.021	.5
4	M4	Z	.021	5.5
5	M5	Z	.021	5.5
6	M7	Z	.021	5.5
7	M6	Z	.028	2

Member Point Loads (BLC 7 : z-dir NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Z	.161	.5
2	M5	Z	.161	.5
3	M7	Z	.161	.5
4	M4	Z	.161	5.5
5	M5	Z	.161	5.5
6	M7	Z	.161	5.5
7	M6	Z	.216	2

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Y	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : z-dir NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : z-dir NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.013	.013	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weigh	None		-1						
2	Weight of Appurtenances	None					13			
3	Weight of Ice Only	None					13	1		
4	x-dir NESC Heavy Wind	None					13			
5	x-dir NESC Extreme Wind	None					13			
6	z-dir NESC Heavy Wind	None					7	1		
7	z-dir NESC Extreme Wind	None					7	1		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-dir NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	x-dir NESC Extreme Wind	Yes	Y		1	1	2	1	5	1														
3	z-dir NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	6	2.5												
4	z-dir NESC Extreme Wi...	Yes	Y		1	1	2	1	7	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	0	4	1.119	3	-.254	3	-.369	2	0	4	0	4
2		min	-.81	2	.421	2	-.812	2	-.831	3	0	1	0	1
3	N1	max	0	4	.564	1	.812	2	-.369	2	0	4	0	4
4		min	-.81	2	.248	4	-.527	4	-.831	3	0	1	0	1
5	Totals:	max	0	4	1.65	3	0	2						
6		min	-1.62	2	.774	2	-1.292	4						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-.267	1.086	-.268	-.798	0	0
2	1	N1	-.267	.564	.268	-.798	0	0
3	1	Totals:	-.535	1.65	0			
4	1	COG (ft):	X: -.357	Y: -.014	Z: .967			

Joint Reactions

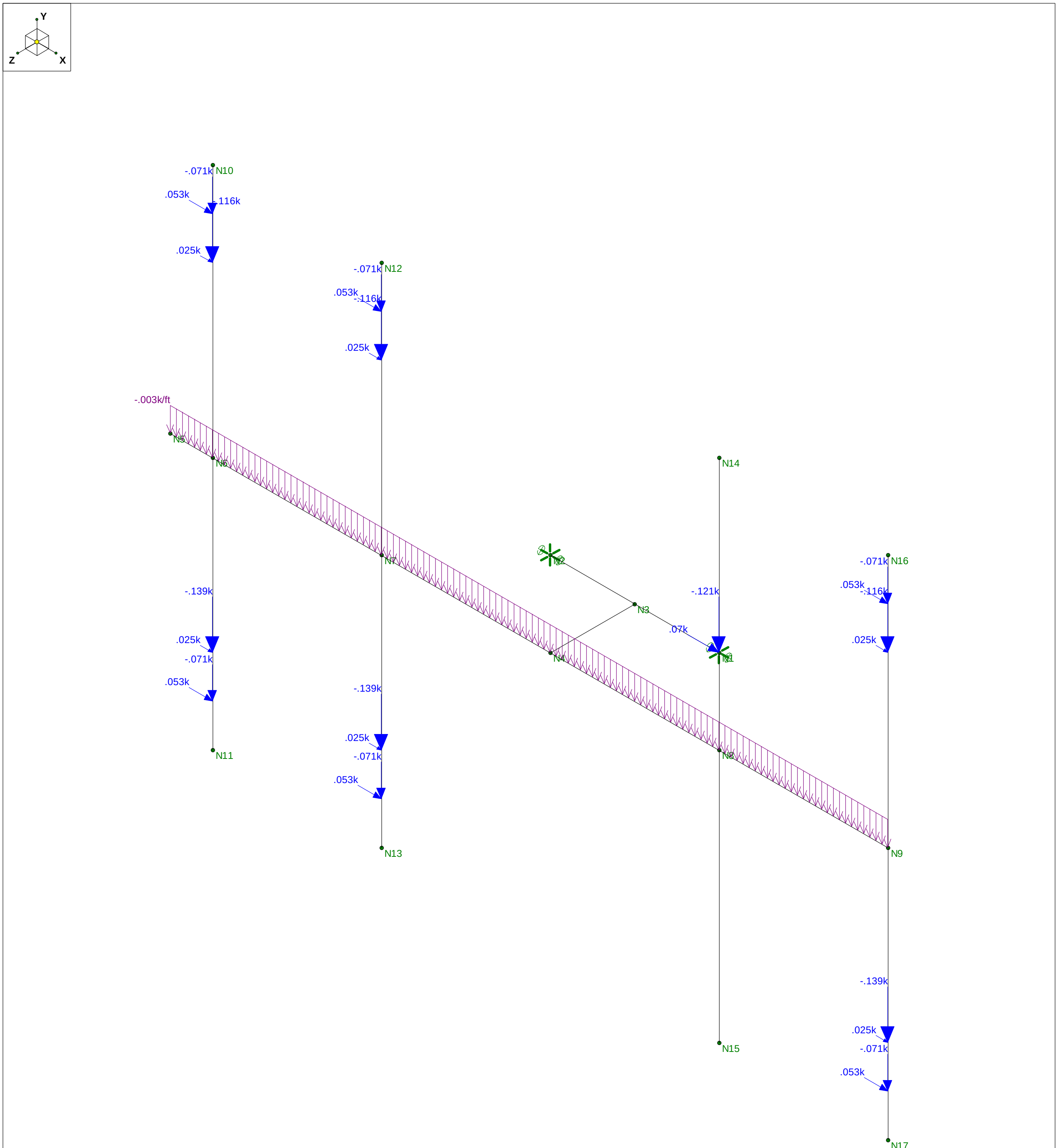
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-.81	.421	-.812	-.369	0	0
2	2	N1	-.81	.353	.812	-.369	0	0
3	2	Totals:	-1.62	.774	0			
4	2	COG (ft):	X: -.36	Y: -.058	Z: .953			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	0	1.119	-.254	-.831	0	0
2	3	N1	0	.531	-.174	-.831	0	0
3	3	Totals:	0	1.65	-.427			
4	3	COG (ft):	X: -.357	Y: -.014	Z: .967			

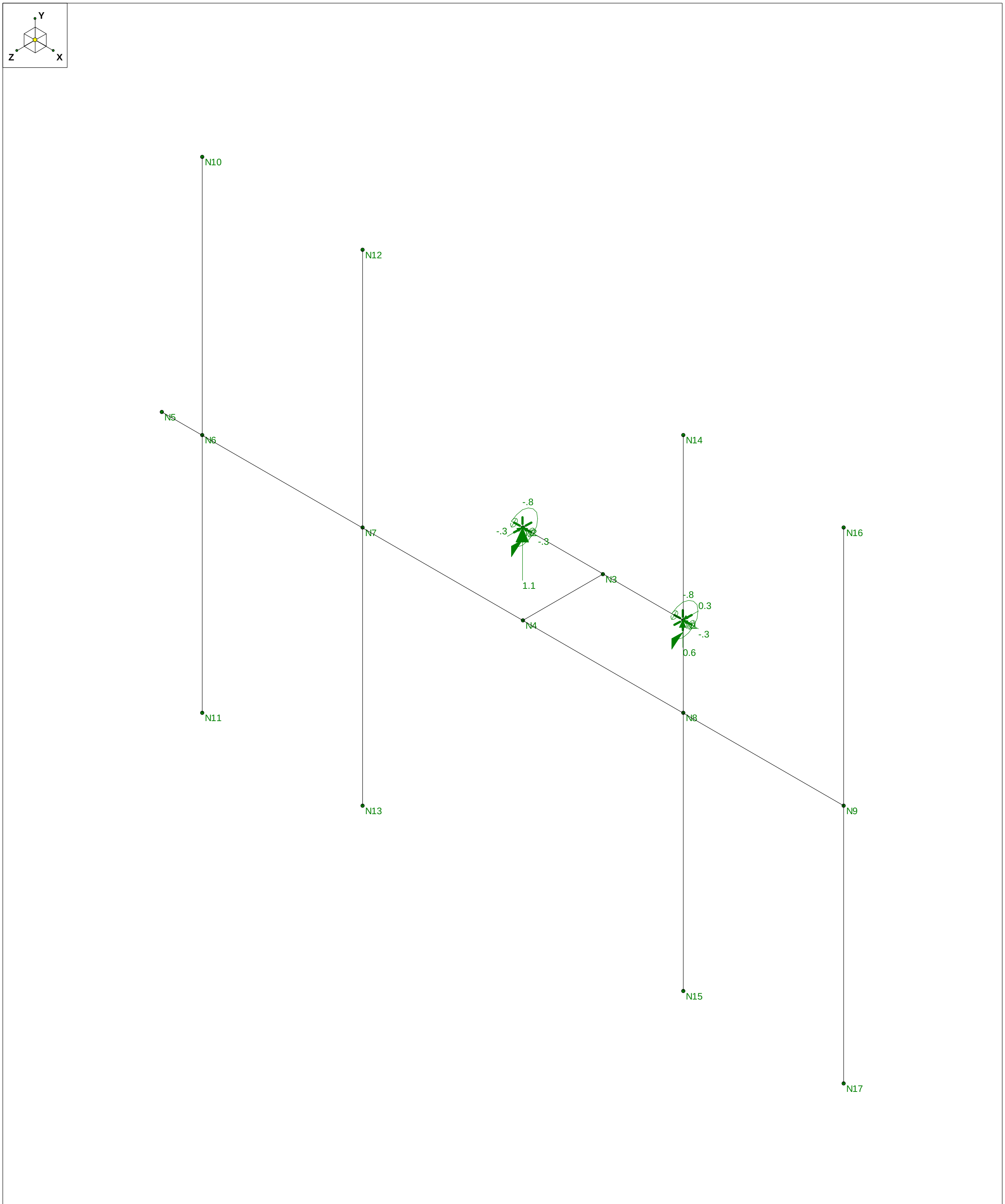
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N2	0	.526	-.765	-.473	0	0
2	4	N1	0	.248	-.527	-.473	0	0
3	4	Totals:	0	.774	-1.292			
4	4	COG (ft):	X: -.36	Y: -.058	Z: .953			



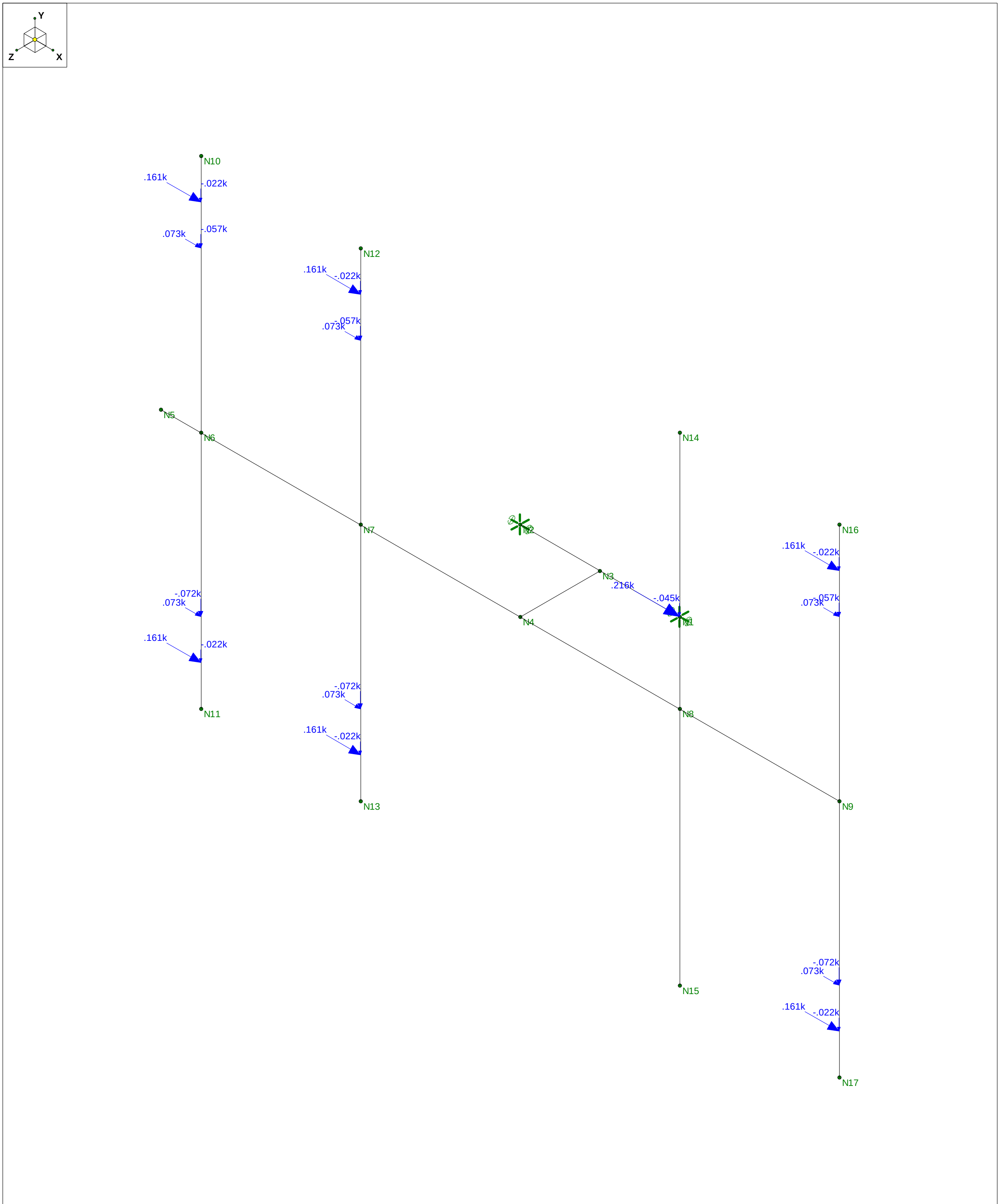
Loads: LC 1, x-dir NESC Heavy Wind

CENTEK Engineering, Inc.	Tower # 845 - Verizon Mast	
TJL		Mar 4, 2019 at 1:47 PM
18058.43	LC #1 Loads	Verizon Antenna Mast - NESC.r3d



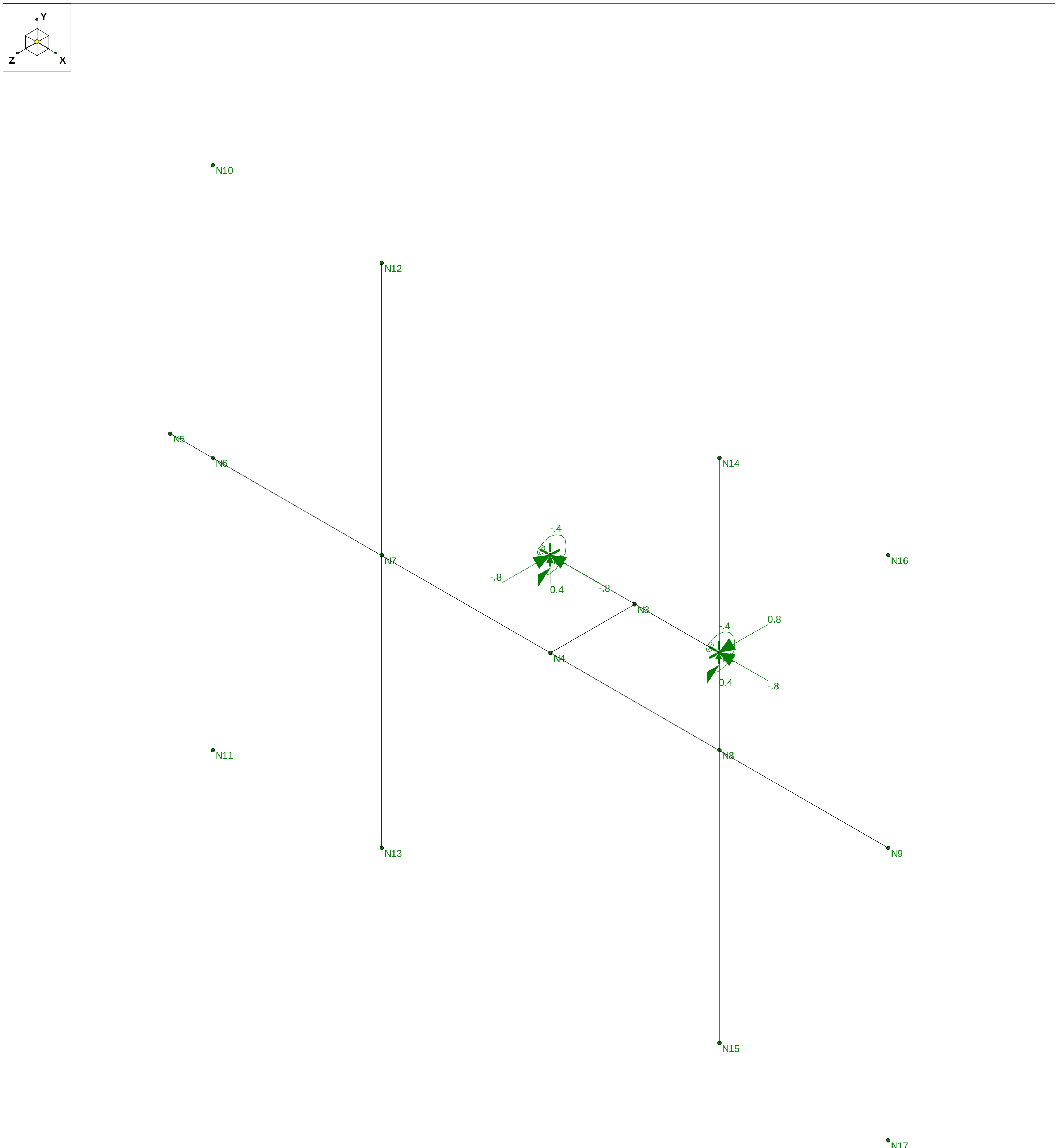
Results for LC 1, x-dir NESC Heavy Wind
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:48 PM
18058.43	LC #1 Reactions	Verizon Antenna Mast - NESC.r3d



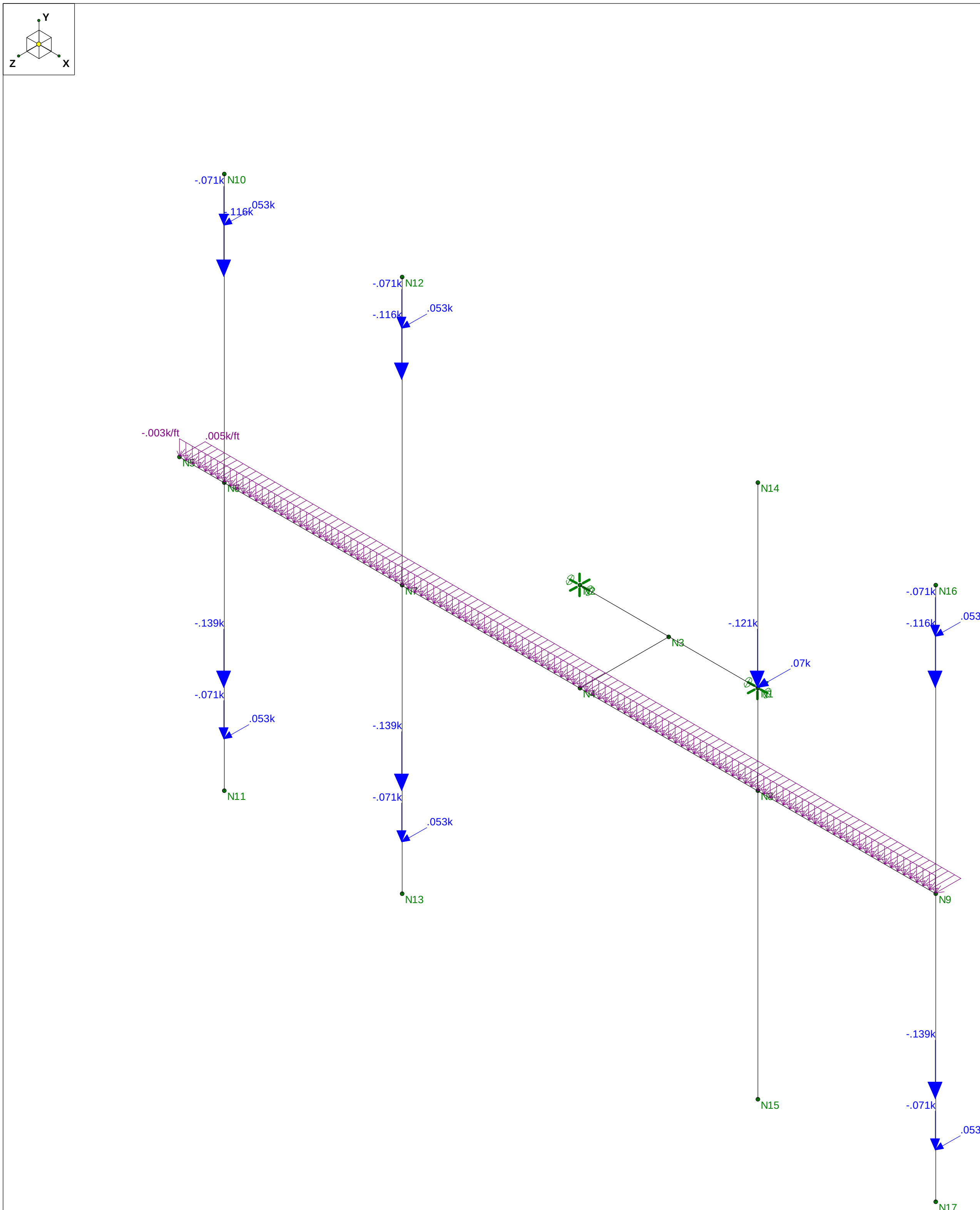
Loads: LC 2, x-dir NESC Extreme Wind

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:47 PM
18058.43	LC #2 Loads	Verizon Antenna Mast - NESC.r3d



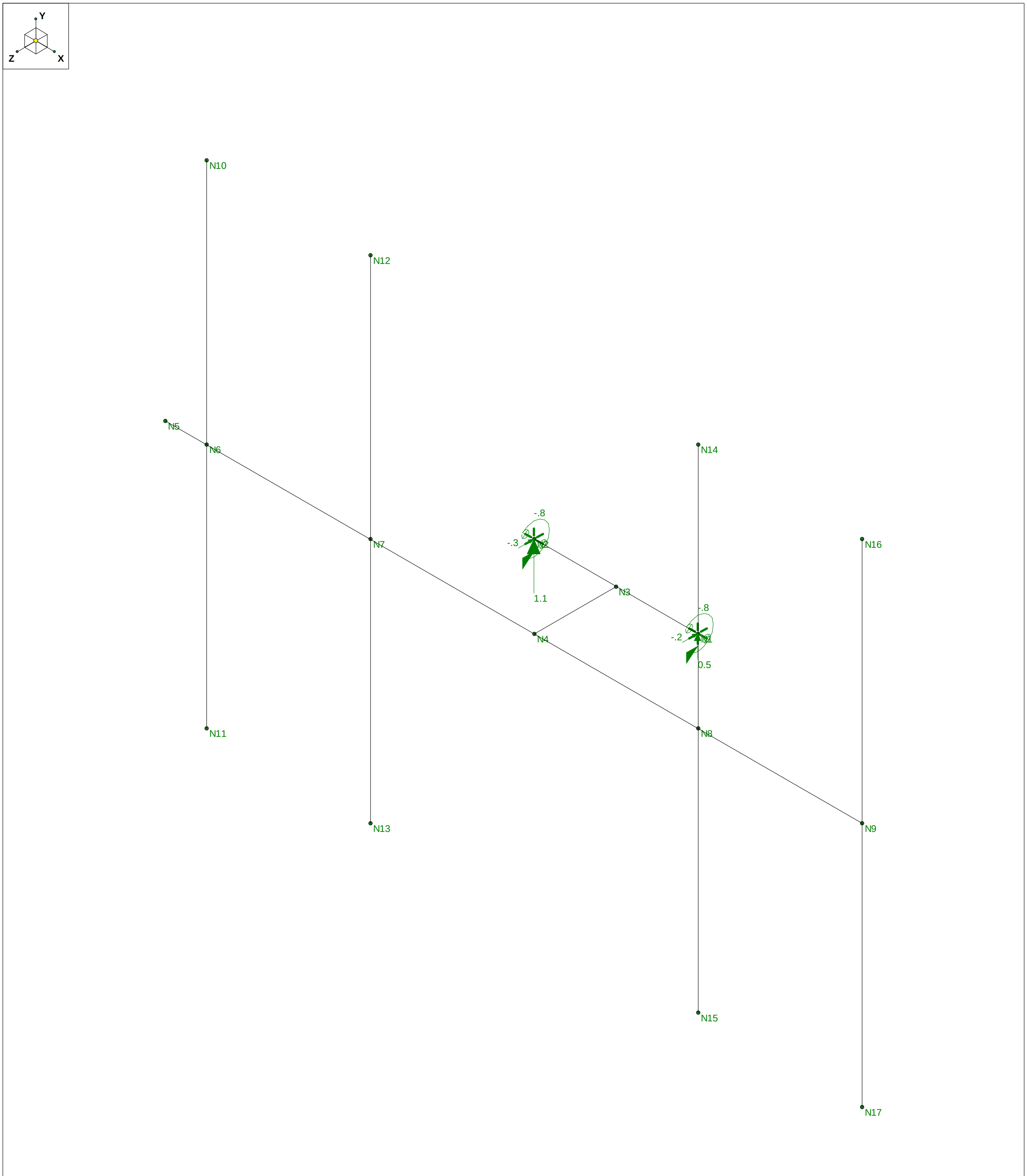
Results for LC 2, x-dir NESC Extreme Wind
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:49 PM
18058.43	LC #2 Reactions	Verizon Antenna Mast - NESC.r3d



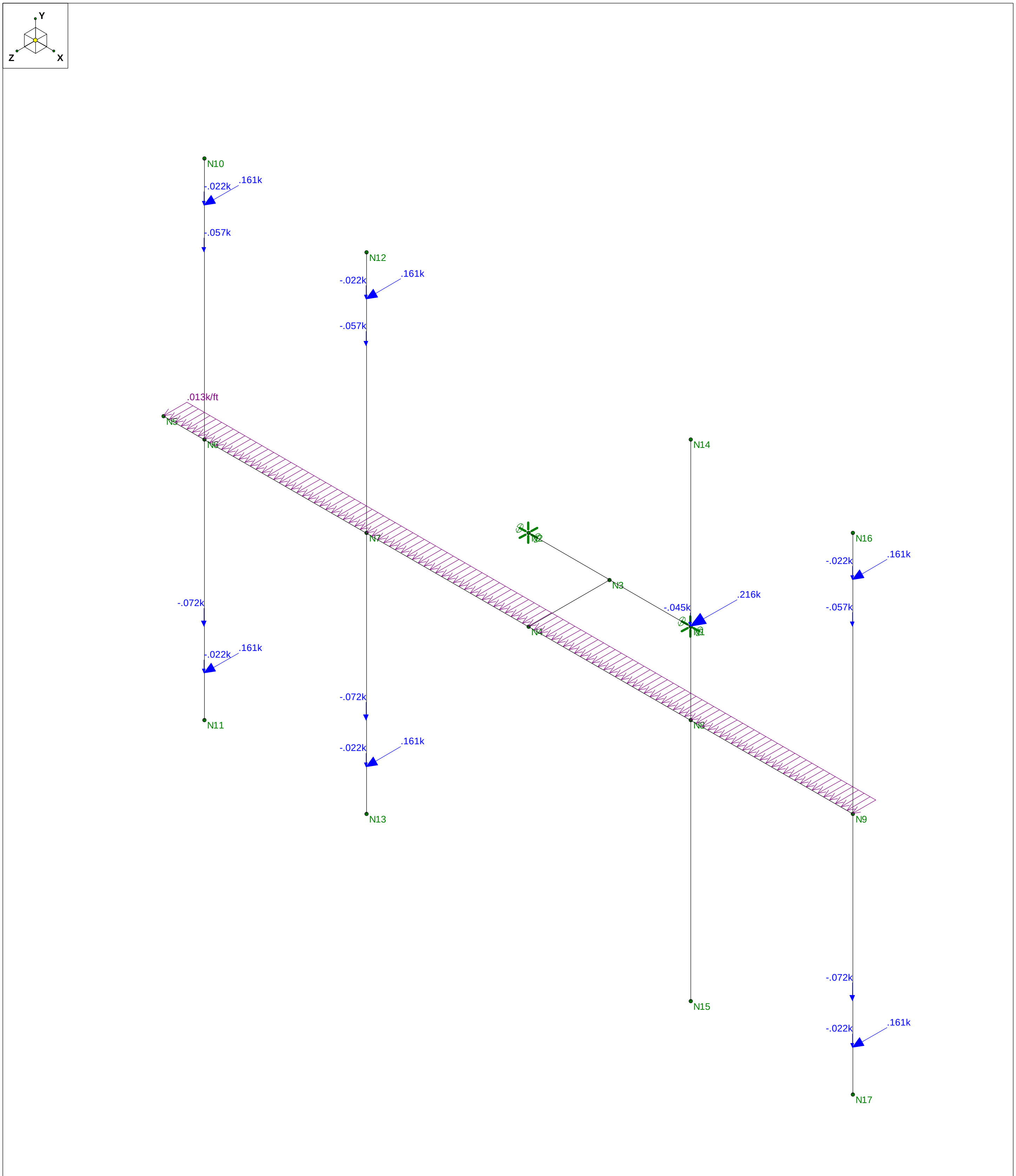
Loads: LC 3, z-dir NESC Heavy Wind

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:47 PM
18058.43	LC #3 Loads	Verizon Antenna Mast - NESC.r3d



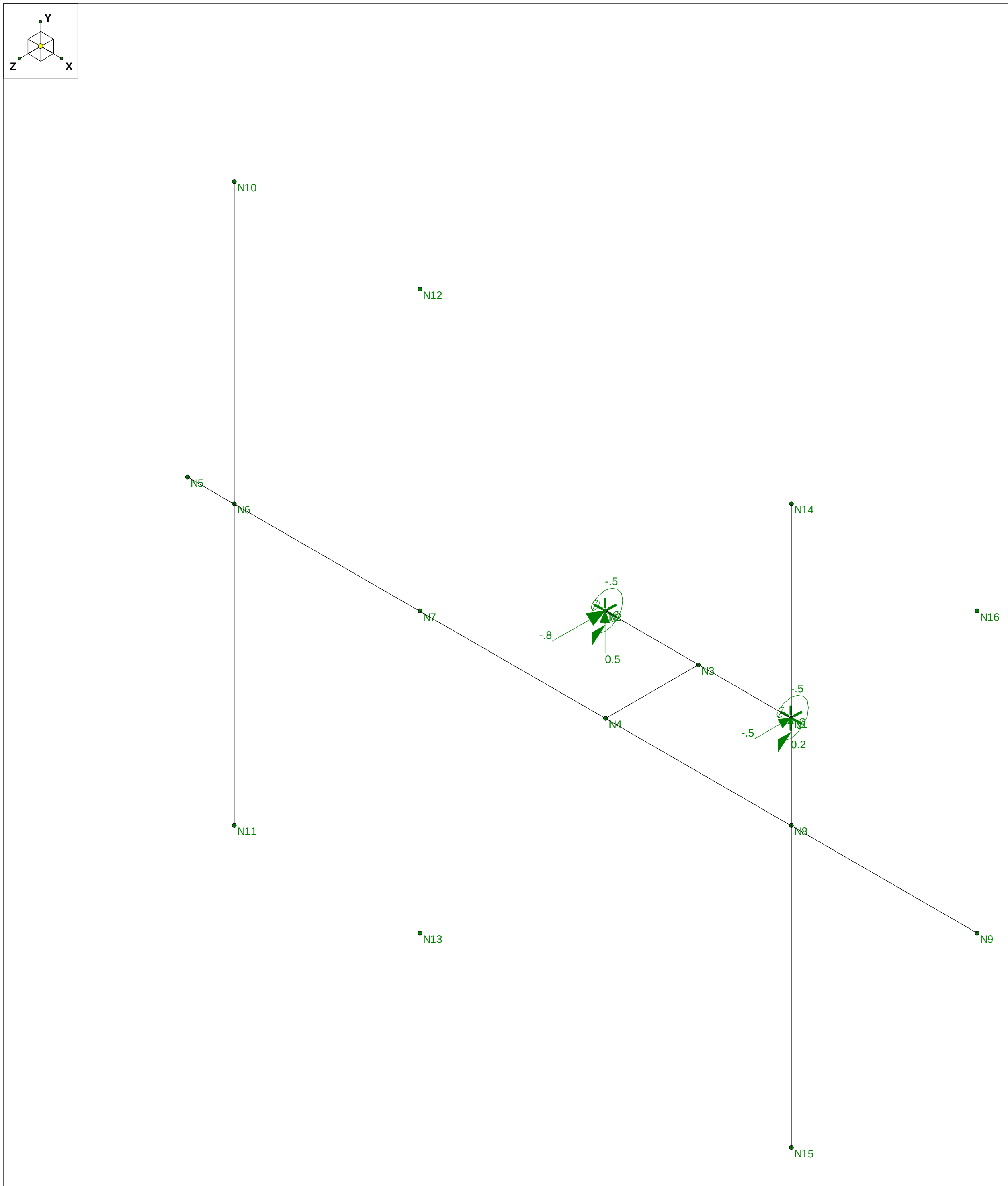
Results for LC 3, z-dir NESC Heavy Wind
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:49 PM
18058.43	LC #3 Reactions	Verizon Antenna Mast - NESC.r3d



Loads: LC 4, z-dir NESC Extreme Wind

CENTEK Engineering, Inc.	Tower # 845 - Verizon Mast	
TJL		Mar 4, 2019 at 1:48 PM
18058.43	LC #4 Loads	Verizon Antenna Mast - NESC.r3d



Results for LC 4, z-dir NESC Extreme Wind
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 845 - Verizon Mast	Mar 4, 2019 at 1:50 PM
18058.43	LC #4 Reactions	Verizon Antenna Mast - NESC.r3d

Built-Up Section Properties

Description Pole #845 Section Properties @ Top

General Information

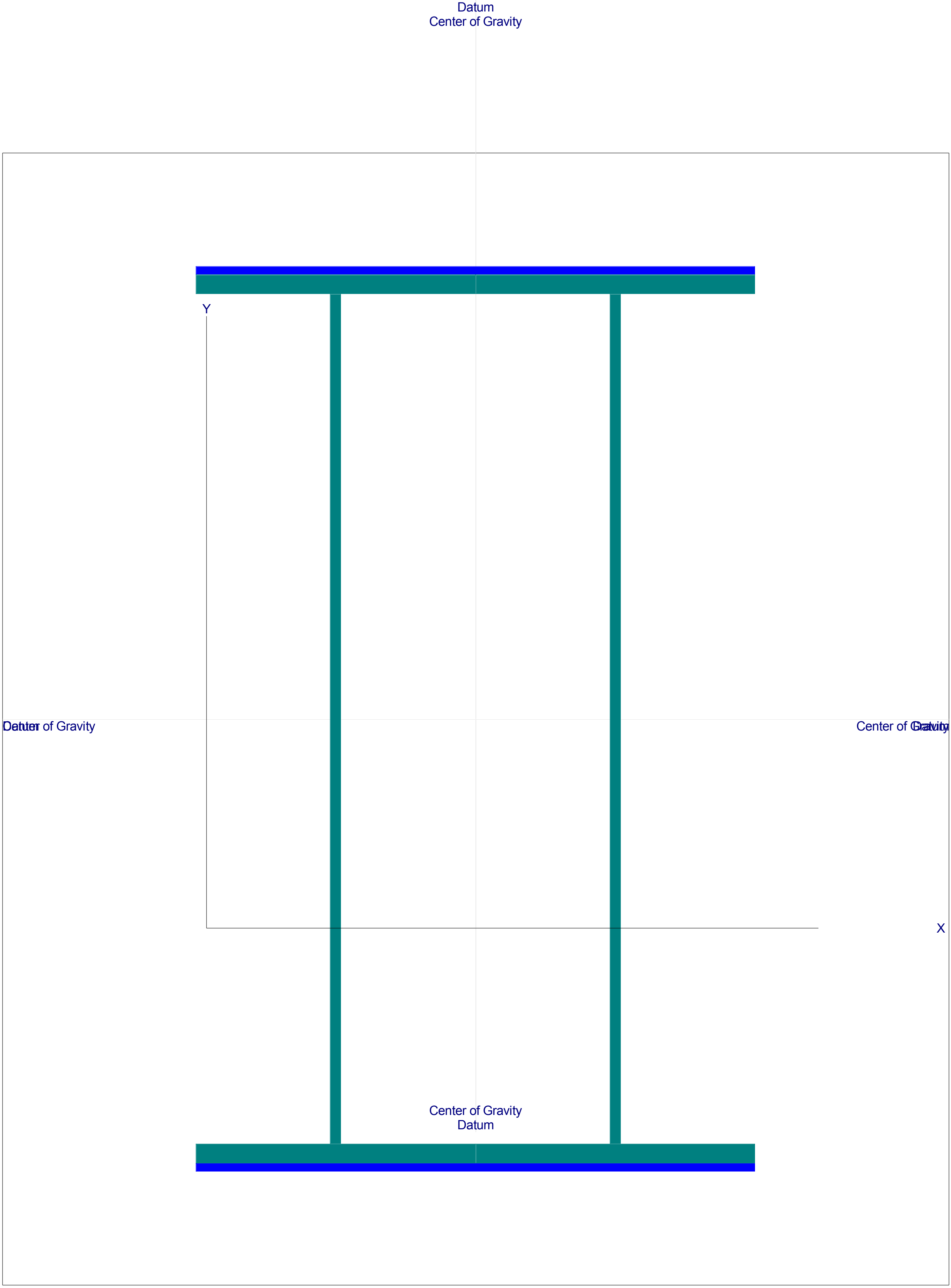
	Type...					X cg	Y cg
#1	Rectangular	Height	0.1875 in	Width	13.0000 in	0.0000 in	10.4238 in
#2	Rectangular	Height	0.1875 in	Width	13.0000 in	0.0000 in	-10.4238 in

Steel Shapes

#1:	Name	**W21x44**	Angle	**0** deg	Depth	20.6600 in	Ixx	843.0000 in4
	Location of Centroid from Datum				Width	6.5000 in	Iyy	20.7000 in4
	Xcg	**3.250** in	Ycg	**0.000** in	Area	13.0000 in2	Xbar	3.250 in
							Ybar	10.330 in
#2:	Name	**W21x44**	Angle	**0** deg	Depth	20.6600 in	Ixx	843.0000 in4
	Location of Centroid from Datum				Width	6.5000	Iyy	20.7000 in4
	Xcg	**-3.250** in	Ycg	**0.000** in	Area	13.0000 in2	Xbar	3.250 in
							Ybar	10.330 in

Summary

Total Area	30.8750 in2	Ixx	2,215.710 in4	r xx	8.4714 in
		Iyy	384.681 in4	r yy	3.5298 in
X cg Dist.	0.0000 in	Edge Distances from CG...			
Y cg Dist.	0.0000 in	+X	6.5000 in	S left	59.1817 in3
		-X	-6.5000 in	S right	59.1817 in3
		+Y	10.5176 in	S top	210.6679 in3
		-Y	-10.5176 in	S bottom	210.6679 in3


Datum
Center of Gravity
Y
Datum
Center of Gravity
Center of Gravity
Datum
X
Center of Gravity
Datum

Title : Pole #845 - Verizon Trumbull 4 **Job #** 15240.000
Dsgnr: TJL **Date:** 11:00AM, 2 NOV 15
Description : Pole Section Properties

Scope : Verizon Antenna Installation on Eversource Pole

Built-Up Section Properties

Description Pole #845 Section Properties @ Base

General Information

	Type...					X cg	Y cg
#1	Rectangular	Height	0.5000 in	Width	54.0000 in	0.0000 in	10.5800 in
#2	Rectangular	Height	0.5000 in	Width	54.0000 in	0.0000 in	-10.5800 in

Steel Shapes

#1: Name **W21x44** Angle **0** deg
Location of Centroid from Datum
Xcg **23.750** in Ycg **0.000** in

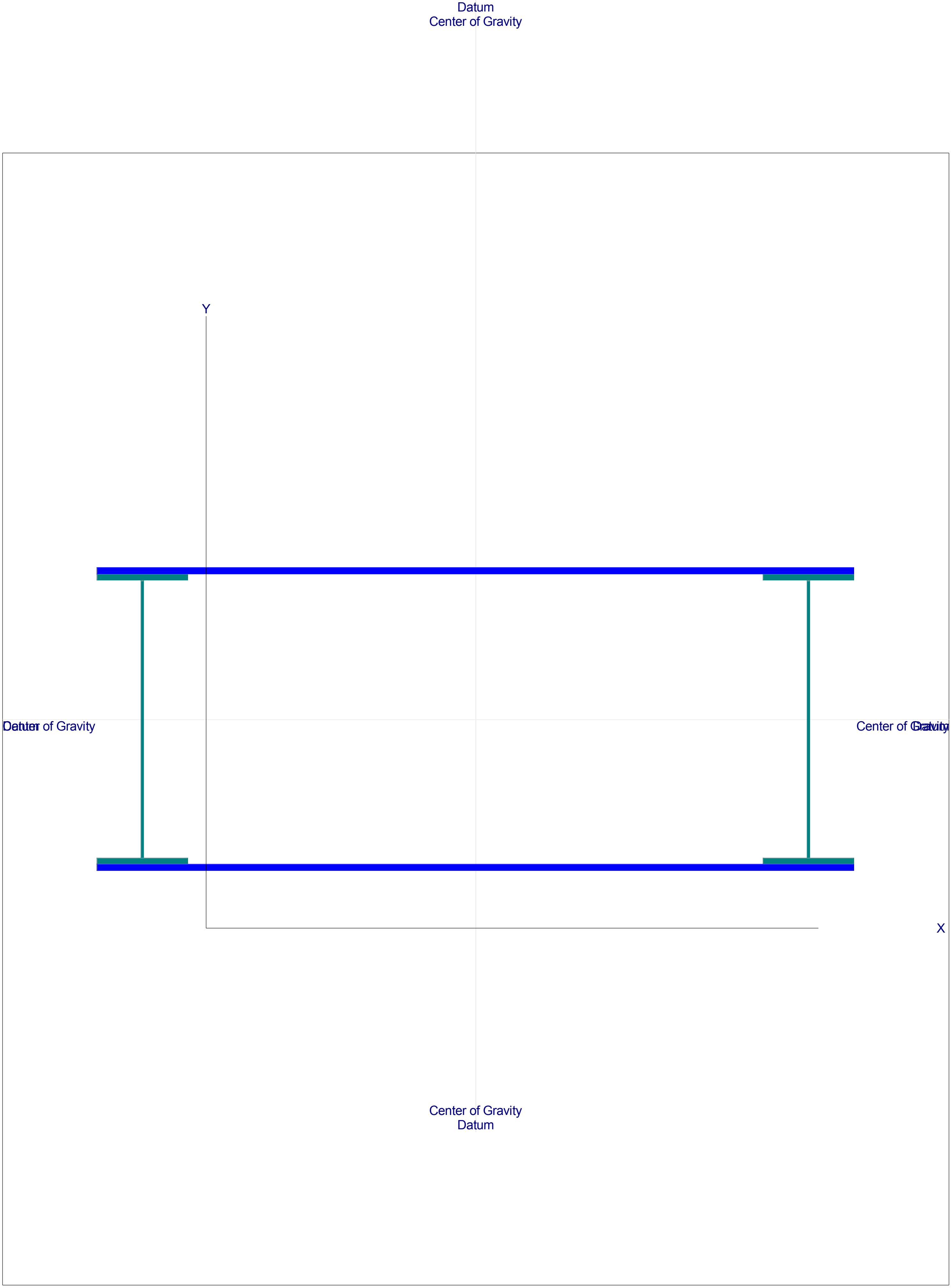
Depth	20.6600 in	Ixx	843.0000 in4
Width	6.5000 in	Iyy	20.7000 in4
Area	13.0000 in2	Xbar	3.250 in
		Ybar	10.330 in

#2: Name **W21x44** Angle **0** deg
Location of Centroid from Datum
Xcg **-23.750** in Ycg **0.000** in

Depth	20.6600 in	Ixx	843.0000 in4
Width	6.5000	Iyy	20.7000 in4
Area	13.0000 in2	Xbar	3.250 in
		Ybar	10.330 in

Summary

Total Area	80.0000 in2	Ixx	7,731.691 in4	r xx	9.8309 in
		Iyy	27,829.025 in4	r yy	18.6511 in
X cg Dist.	0.0000 in				
Y cg Dist.	0.0000 in	Edge Distances from CG...			
		+X	27.0000 in	S left	1,030.7046 in3
		-X	-27.0000 in	S right	1,030.7046 in3
		+Y	10.8300 in	S top	713.9142 in3
		-Y	-10.8300 in	S bottom	713.9142 in3


Datum
Center of Gravity
Y
Datum
Center of Gravity
Center of Gravity
Datum
X
Center of Gravity
Datum

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Pole Above Grade = $TME := 150$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(0.67 \cdot \frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.267$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.295$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.796$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.837$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 32.8$ psf (NESC 2007 Section 250.C.2)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

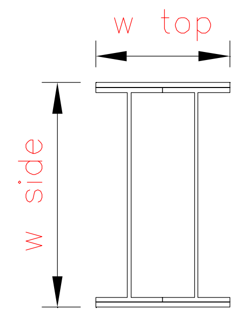
Overload Factors for Vertical Loads:

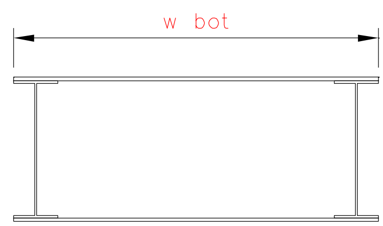
NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on Pole

Pole Data:

Shape =	Flat	
Width Side =	$W_{side} := 21.7$	in
Width Top =	$W_{top} := 13$	in
Width Bottom =	$W_{bot} := 54$	in
Length =	$L := 150$	ft
Area Top =	$A_{top} := 30.9$	sq in
Area Bottom =	$A_{bot} := 80.0$	sq in
Weight of Steel =	$W_{steel} := 490$	pcf
Area Ice Top =	$Ai_{top} := 40$	sq in
Area Ice Bottom =	$Ai_{bot} := 82$	sq in





Gravity Loads (without ice)

Weight Pole Top = $Wt_{top} := \frac{A_{top}}{144} \cdot W_{steel} = 105$ plf **BLC 2**

Weight Pole Bottom = $Wt_{bot} := \frac{A_{bot}}{144} \cdot W_{steel} = 272$ plf **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Pole Top = $W_{ICE.top} := Id \cdot \frac{Ai_{top}}{144} = 16$ plf **BLC 3**

Weight of Ice on Pole Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{bot}}{144} = 32$ plf **BLC 3**

Wind Load (NESC Extreme)

Pole Projected Surface Area Top =	$A_{top} := \frac{W_{top}}{12} = 1.083$	sq ft/ft	
Pole Projected Surface Area Bottom =	$A_{bot} := \frac{W_{bot}}{12} = 4.5$	sq ft/ft	
Pole Projected Surface Area Side =	$A_{side} := \frac{W_{side}}{12} = 1.808$	sq ft/ft	
Total Pole Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 57$	plf	**BLC 7**
Total Pole Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 236$	plf	**BLC 7**
Total Pole Wind Force Side =	$qz \cdot Cd_F \cdot A_{side} = 95$	plf	**BLC 5**

Wind Load (NESE Heavy)

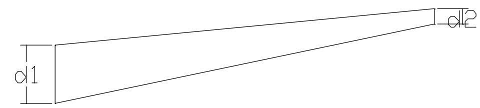
Pole Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(W_{top} + 2 \cdot Ir)}{12} = 1.167$	sq ft/ft	
Pole Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(W_{bot} + 2 \cdot Ir)}{12} = 4.583$	sq ft/ft	
Pole Projected Surface Area w/ Ice Side =	$AICE_{side} := \frac{(W_{side} + 2 \cdot Ir)}{12} = 1.892$	sq ft/ft	
Total Pole Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 29$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Side =	$p \cdot Cd_F \cdot AICE_{side} = 12$	plf	**BLC 4**

Development of Wind & Ice Load on Pole Arms

ARM Data:

Shape = Flat

Depth of Arm at Top = $ARM_{d1} := 12$



Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 8$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right) \cdot \left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right) \cdot \left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 33$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right) \cdot \left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 21$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right) \cdot \left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 8$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 53$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 18$	plf	**BLC 7**

Wind Load (NESE Heavy)

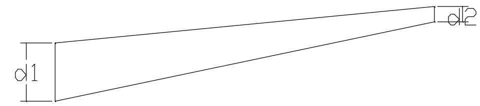
Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.083$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on Pole Arms

ARM Data:

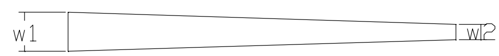
Shape = Flat

Depth of Arm at Top = $ARM_{d1} := 15$



Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 10$



Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := (ARM_{d1} \cdot ARM_{W1}) - [(ARM_{W1} - 2ARM_t) \cdot (ARM_{d1} - 2ARM_t)]$

Arm Area Bottom = $A_{armbot} := (ARM_{d2} \cdot ARM_{W2}) - [(ARM_{W2} - 2ARM_t) \cdot (ARM_{d2} - 2ARM_t)]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 42$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := (ARM_{d1} + 2 \cdot Ir) \cdot (ARM_{W1} + 2 \cdot Ir) - ARM_{d1} \cdot ARM_{W1} = 26$

Arm Area w/ Ice Bottom = $Ai_{armbot} := (ARM_{d2} + 2 \cdot Ir) \cdot (ARM_{W2} + 2 \cdot Ir) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 10$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1.25$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 66$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 18$	plf	**BLC 7**

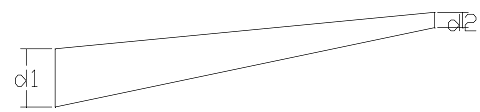
Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.333$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 9$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on Pole Arms

ARM Data:

Shape = Flat



Depth of Arm at Top = $ARM_{d1} := 18$

Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 12$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right) \cdot \left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right) \cdot \left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 50$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right) \cdot \left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 31$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right) \cdot \left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 12$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1.5$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 79$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 18$	plf	**BLC 7**

Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.583$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 10$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (0-ft to 140-ft)

Coax Type =	HELIAX 1-5/8"			
Shape =	Round		(User Input)	
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)	
Coax Cable Length =	$L_{coax} := 100$	ft	(User Input)	
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)	
Total Number of Coax =	$N_{coax} := 26$		(User Input)	(24 T-Mobile & 2 Verizon)
No. of Coax Projecting Outside Face of Pole X-DIR =	$NP_{coaxX} := 2$		(User Input)	
No. of Coax Projecting Outside Face of Pole Z-DIR =	$NP_{coaxZ} := 2$		(User Input)	

Wind Load (NESC Extreme)

Coax projected surface area X-DIR = $A_{coaxX} := \frac{(NP_{coaxX} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force X-DIR = $F_{coaxX} := qz \cdot Cd_{coax} \cdot A_{coaxX} = 17$ plf **BLC 19**

Coax projected surface area Z-DIR = $A_{coaxZ} := \frac{(NP_{coaxZ} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force Z-DIR = $F_{coaxZ} := qz \cdot Cd_{coax} \cdot A_{coaxZ} = 17$ plf **BLC 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice X-DIR = $AICE_{coaxX} := \frac{(NP_{coaxX} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice X-DIR = $Fi_{coaxX} := p \cdot Cd_{coax} \cdot AICE_{coaxX} = 3$ plf **BLC 18**

Coax projected surface area w/ Ice Z-DIR = $AICE_{coaxZ} := \frac{(NP_{coaxZ} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice Z-DIR = $Fi_{coaxZ} := p \cdot Cd_{coax} \cdot AICE_{coaxZ} = 3$ plf **BLC 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 27$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\,2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 39$ plf **BLC 17**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (90-ft to 140-ft)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 100$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 24$ (User Input) (24 T-Mobile)

No. of Coax Projecting Outside Face of Pole X-DIR = $NP_{coaxX} := 2$ (User Input)

No. of Coax Projecting Outside Face of Pole Z-DIR = $NP_{coaxZ} := 2$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area X-DIR = $A_{coaxX} := \frac{(NP_{coaxX} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force X-DIR = $F_{coaxX} := qz \cdot Cd_{coax} \cdot A_{coaxX} = 17$ plf **BLC 19**

Coax projected surface area Z-DIR = $A_{coaxZ} := \frac{(NP_{coaxZ} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force Z-DIR = $F_{coaxZ} := qz \cdot Cd_{coax} \cdot A_{coaxZ} = 17$ plf **BLC 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice X-DIR = $AICE_{coaxX} := \frac{(NP_{coaxX} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice X-DIR = $Fi_{coaxX} := p \cdot Cd_{coax} \cdot AICE_{coaxX} = 3$ plf **BLC 18**

Coax projected surface area w/ Ice Z-DIR = $AICE_{coaxZ} := \frac{(NP_{coaxZ} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice Z-DIR = $Fi_{coaxZ} := p \cdot Cd_{coax} \cdot AICE_{coaxZ} = 3$ plf **BLC 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 25$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 36$ plf **BLC 17**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2
7	A572 Gr.60	29000	11154	.3	.65	.49	60	1.5	75	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pole 0'	0'	Column	Wide Flange	A572 Gr.60	Typical	79.56	27580.7	7721	13783.6
2	Pole 5'	5'	Column	Wide Flange	A572 Gr.60	Typical	78.189	25786.2	7566.93	13245.5
3	Pole 10'	10'	Column	Wide Flange	A572 Gr.60	Typical	76.818	24065.1	7412.85	12710.5
4	Pole 15'	15	Column	Wide Flange	A572 Gr.60	Typical	75.447	22416.3	7258.78	12178.9
5	Pole 20'	20'	Column	Wide Flange	A572 Gr.60	Typical	74.076	20881.3	7104.7	11681.1
6	Pole 25'	25'	Column	Wide Flange	A572 Gr.60	Typical	72.705	19330	6950.63	11125.1
7	Pole 30'	30'	Column	Wide Flange	A572 Gr.60	Typical	65.658	16898.9	6132.17	9804.67
8	Pole 35'	35'	Column	Wide Flange	A572 Gr.60	Typical	64.461	15617	5998.48	9340.72
9	Pole 40'	40'	Column	Wide Flange	A572 Gr.60	Typical	63.266	14395.7	5864.91	8880.99
10	Pole 45'	45'	Column	Wide Flange	A572 Gr.60	Typical	62.069	13233	5731.21	8424.68
11	Pole 50'	50'	Column	Wide Flange	A572 Gr.60	Typical	60.872	12128.2	5597.52	7972.03
12	Pole 55'	55'	Column	Wide Flange	A572 Gr.60	Typical	59.677	11080.5	5463.95	7522.82
13	Pole 60'	60'	Column	Wide Flange	A572 Gr.60	Typical	53.745	9530.9	4782.4	6497.85
14	Pole 65'	65'	Column	Wide Flange	A572 Gr.60	Typical	52.721	8652.01	4668.72	6107
15	Pole 70'	70'	Column	Wide Flange	A572 Gr.60	Typical	51.697	7821.92	4554.94	5720.13
16	Pole 75'	75'	Column	Wide Flange	A572 Gr.60	Typical	50.673	7040.29	4441.26	5337.17
17	Pole 80'	80'	Column	Wide Flange	A572 Gr.60	Typical	49.648	6305.72	4327.48	4958.93
18	Pole 85'	85'	Column	Wide Flange	A572 Gr.60	Typical	48.625	5617.66	4213.8	4585.5
19	Pole 90'	90'	Column	Wide Flange	A572 Gr.60	Typical	40.254	4445.95	3264.77	3431.03
20	Pole 95'	95'	Column	Wide Flange	A572 Gr.60	Typical	39.571	3917.71	3189.81	3161.77
21	Pole 100'	100'	Column	Wide Flange	A572 Gr.60	Typical	38.888	3426.45	3114.94	2895.62
22	Pole 105'	105'	Column	Wide Flange	A572 Gr.60	Typical	38.205	2971.38	3039.98	2632.46
23	Pole 110'	110'	Column	Wide Flange	A572 Gr.60	Typical	37.522	2551.93	2965.03	2373.18
24	Pole 115'	115'	Column	Wide Flange	A572 Gr.60	Typical	36.84	2167.55	2890.15	2117.95
25	Pole 120'	120'	Column	Wide Flange	A572 Gr.60	Typical	33.523	1718.78	2521.02	1659.03
26	Pole 125'	125'	Column	Wide Flange	A572 Gr.60	Typical	33.009	1420.3	2465	1457.02
27	Pole 130'	130'	Column	Wide Flange	A572 Gr.60	Typical	32.496	1152.64	2409.03	1259.46
28	Pole 135'	135'	Column	Wide Flange	A572 Gr.60	Typical	31.983	915.275	2353.07	1065.44
29	Pole 140'	140'	Column	Wide Flange	A572 Gr.60	Typical	31.47	707.682	2297.04	876.406
30	Pole 145'	145'	Column	Wide Flange	A572 Gr.60	Typical	30.956	529.465	2241.07	694.633
31	5' Arm Base	5' Arm Base	Beam	Tube	A36 Gr.36	Typical	9.75	107.703	201.453	215.555
32	5' Arm Mid	5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	6.75	40.016	62.641	75.013
33	8' Arm Base	8' Arm Base	Beam	Tube	A36 Gr.36	Typical	12.25	214.005	399.005	426.748
34	8' Arm Mid	8' Arm Mid	Beam	Tube	A36 Gr.36	Typical	8	65.573	105.26	123.877
35	10.5' Arm Base	10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical	14.75	374.057	695.932	743.994
36	10.5 Arm Mid	10.5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	9.25	100.193	163.818	190.317

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Pole 0'	5			Lbyy									Lateral
2	M2	8' Arm Mid	4.482			Lbyy									Lateral
3	M3	8' Arm Mid	4.482			Lbyy									Lateral
4	M4	10.5 Arm...	5.672			Lbyy									Lateral
5	M5	10.5 Arm...	5.672			Lbyy									Lateral
6	M6	8' Arm Mid	4.349			Lbyy									Lateral
7	M7	8' Arm Mid	4.349			Lbyy									Lateral
8	M8	5' Arm Mid	2.795			Lbyy									Lateral
9	M9	5' Arm Mid	2.795			Lbyy									Lateral
10	M11	Pole 5'	5			Lbyy									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
11	M12	Pole 10'	5			Lbyy									Lateral
12	M13	Pole 15'	5			Lbyy									Lateral
13	M14	Pole 20'	5			Lbyy									Lateral
14	M15	Pole 25'	5			Lbyy									Lateral
15	M16	Pole 30'	5			Lbyy									Lateral
16	M17	Pole 35'	5			Lbyy									Lateral
17	M18	Pole 40'	5			Lbyy									Lateral
18	M19	Pole 45'	5			Lbyy									Lateral
19	M20	Pole 50'	5			Lbyy									Lateral
20	M21	Pole 55'	5			Lbyy									Lateral
21	M22	Pole 60'	5			Lbyy									Lateral
22	M23	Pole 65'	5			Lbyy									Lateral
23	M24	Pole 70'	5			Lbyy									Lateral
24	M25	Pole 75'	5			Lbyy									Lateral
25	M26	Pole 80'	5			Lbyy									Lateral
26	M27	Pole 85'	5			Lbyy									Lateral
27	M28	Pole 90'	5			Lbyy									Lateral
28	M29	Pole 95'	5			Lbyy									Lateral
29	M30	Pole 100'	5			Lbyy									Lateral
30	M31	Pole 105'	5			Lbyy									Lateral
31	M32	Pole 110'	5			Lbyy									Lateral
32	M33	Pole 115'	5			Lbyy									Lateral
33	M34	Pole 120'	5			Lbyy									Lateral
34	M35	Pole 125'	5			Lbyy									Lateral
35	M36	Pole 130'	5			Lbyy									Lateral
36	M37	Pole 135'	5			Lbyy									Lateral
37	M38	Pole 140'	5			Lbyy									Lateral
38	M39	Pole 145'	5			Lbyy									Lateral
39	M40	8' Arm B...	4.482			Lbyy									Lateral
40	M41	8' Arm B...	4.482			Lbyy									Lateral
41	M42	10.5' Arm...	5.672			Lbyy									Lateral
42	M43	10.5' Arm...	5.672			Lbyy									Lateral
43	M44	8' Arm B...	4.349			Lbyy									Lateral
44	M45	8' Arm B...	4.349			Lbyy									Lateral
45	M46	5' Arm B...	2.795			Lbyy									Lateral
46	M47	5' Arm B...	2.795			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	N21		90	Pole 0'	Column	Wide Flange	A572 Gr....	Typical
2	M2	ARM1-L...	N49			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
3	M3	ARM1-R...	N50			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
4	M4	ARM2-L...	N51			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
5	M5	ARM2-R...	N52			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
6	M6	ARM3-L...	N53			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
7	M7	ARM3-R...	N54			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
8	M8	ARM4-R...	N55			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
9	M9	ARM4-L...	N56			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
10	M10	N18	N19			RIGID	None	None	RIGID	Typical
11	M11	N21	N22		90	Pole 5'	Column	Wide Flange	A572 Gr....	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
12	M12	N22	N23		90	Pole 10'	Column	Wide Flange	A572 Gr....	Typical
13	M13	N23	N24		90	Pole 15'	Column	Wide Flange	A572 Gr....	Typical
14	M14	N24	N25		90	Pole 20'	Column	Wide Flange	A572 Gr....	Typical
15	M15	N25	N26		90	Pole 25'	Column	Wide Flange	A572 Gr....	Typical
16	M16	N26	N27		90	Pole 30'	Column	Wide Flange	A572 Gr....	Typical
17	M17	N27	N28		90	Pole 35'	Column	Wide Flange	A572 Gr....	Typical
18	M18	N28	N29		90	Pole 40'	Column	Wide Flange	A572 Gr....	Typical
19	M19	N29	N30		90	Pole 45'	Column	Wide Flange	A572 Gr....	Typical
20	M20	N30	N31		90	Pole 50'	Column	Wide Flange	A572 Gr....	Typical
21	M21	N31	N32		90	Pole 55'	Column	Wide Flange	A572 Gr....	Typical
22	M22	N32	N33		90	Pole 60'	Column	Wide Flange	A572 Gr....	Typical
23	M23	N33	N34		90	Pole 65'	Column	Wide Flange	A572 Gr....	Typical
24	M24	N34	N35		90	Pole 70'	Column	Wide Flange	A572 Gr....	Typical
25	M25	N35	N36		90	Pole 75'	Column	Wide Flange	A572 Gr....	Typical
26	M26	N36	N37		90	Pole 80'	Column	Wide Flange	A572 Gr....	Typical
27	M27	N37	POLE-C...		90	Pole 85'	Column	Wide Flange	A572 Gr....	Typical
28	M28	POLE-C...	N38		90	Pole 90'	Column	Wide Flange	A572 Gr....	Typical
29	M29	N38	N39		90	Pole 95'	Column	Wide Flange	A572 Gr....	Typical
30	M30	N39	N40		90	Pole 100'	Column	Wide Flange	A572 Gr....	Typical
31	M31	N40	N41		90	Pole 105'	Column	Wide Flange	A572 Gr....	Typical
32	M32	N41	N42		90	Pole 110'	Column	Wide Flange	A572 Gr....	Typical
33	M33	N42	N43		90	Pole 115'	Column	Wide Flange	A572 Gr....	Typical
34	M34	N43	N44		90	Pole 120'	Column	Wide Flange	A572 Gr....	Typical
35	M35	N44	N45		90	Pole 125'	Column	Wide Flange	A572 Gr....	Typical
36	M36	N45	N46		90	Pole 130'	Column	Wide Flange	A572 Gr....	Typical
37	M37	N46	N47		90	Pole 135'	Column	Wide Flange	A572 Gr....	Typical
38	M38	N47	N48		90	Pole 140'	Column	Wide Flange	A572 Gr....	Typical
39	M39	N48	TOP-PO...		90	Pole 145'	Column	Wide Flange	A572 Gr....	Typical
40	M40	N49	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
41	M41	N50	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
42	M42	N51	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
43	M43	N52	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
44	M44	N53	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
45	M45	N54	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
46	M46	N55	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical
47	M47	N56	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-POLE	0	0	0	0	
2	POLE-CONNECTION	0	90	0	0	
3	ARM1-LEFT	-8.88	119.83	0	0	
4	ARM2-LEFT	-11.26	131.83	0	0	
5	ARM3-LEFT	-8.61	143.83	0	0	
6	ARM4-LEFT	-5.54	149.83	0	0	
7	TOP-POLE	0	150	0	0	
8	ARM1-RIGHT	8.88	119.83	0	0	
9	ARM2-RIGHT	11.26	131.83	0	0	
10	ARM3-RIGHT	8.61	143.83	0	0	
11	ARM4-RIGHT	5.54	149.83	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
12	ARM1	0	118.6	0	0	
13	ARM2	0	130.45	0	0	
14	ARM3	0	142.6	0	0	
15	ARM4	0	149.08	0	0	
16	BOTTOM-BRACE	0	138	0	0	
17	TOP-BRACE	0	147	0	0	
18	N18	0.	89.75	1	0	
19	N19	-0.	89.75	-1	0	
20	N20	0	89.75	0	0	
21	N21	0	5	0	0	
22	N22	0	10	0	0	
23	N23	0	15	0	0	
24	N24	0	20	0	0	
25	N25	0	25	0	0	
26	N26	0	30	0	0	
27	N27	0	35	0	0	
28	N28	0	40	0	0	
29	N29	0	45	0	0	
30	N30	0	50	0	0	
31	N31	0	55	0	0	
32	N32	0	60	0	0	
33	N33	0	65	0	0	
34	N34	0	70	0	0	
35	N35	0	75	0	0	
36	N36	0	80	0	0	
37	N37	0	85	0	0	
38	N38	0	95	0	0	
39	N39	0	100	0	0	
40	N40	0	105	0	0	
41	N41	0	110	0	0	
42	N42	0	115	0	0	
43	N43	0	120	0	0	
44	N44	0	125	0	0	
45	N45	0	130	0	0	
46	N46	0	135	0	0	
47	N47	0	140	0	0	
48	N48	0	145	0	0	
49	N49	-4.44	119.215	0	0	
50	N50	4.44	119.215	0	0	
51	N51	-5.63	131.14	0	0	
52	N52	5.63	131.14	0	0	
53	N53	-4.305	143.215	0	0	
54	N54	4.305	143.215	0	0	
55	N55	2.77	149.455	0	0	
56	N56	-2.77	149.455	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-POLE	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	POLE-CONNECTION						

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
3	ARM2-LEFT						
4	ARM1-LEFT						

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Joint Loads and Enforced Displacements (BLC 8 : x-direction NESC Heavy Wire Load)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-1.973
2	ARM4-RIGHT	L	Y	-1.202
3	ARM3-LEFT	L	Y	-4.759
4	ARM3-RIGHT	L	Y	-4.759
5	ARM2-RIGHT	L	Y	-4.759
6	ARM2-LEFT	L	Y	-4.759
7	ARM1-LEFT	L	Y	-4.759
8	ARM1-RIGHT	L	Y	-4.759
9	ARM4-LEFT	L	X	1.475
10	ARM4-RIGHT	L	X	1.101
11	ARM3-LEFT	L	X	2.046
12	ARM3-RIGHT	L	X	2.046
13	ARM2-LEFT	L	X	2.046
14	ARM2-RIGHT	L	X	2.046
15	ARM1-LEFT	L	X	2.046
16	ARM1-RIGHT	L	X	2.046

Joint Loads and Enforced Displacements (BLC 9 : x-driection NESC Extreme Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-.675
2	ARM4-RIGHT	L	Y	-.329
3	ARM3-LEFT	L	Y	-2.109
4	ARM3-RIGHT	L	Y	-2.109
5	ARM2-LEFT	L	Y	-2.109
6	ARM2-RIGHT	L	Y	-2.109
7	ARM1-RIGHT	L	Y	-2.109
8	ARM1-LEFT	L	Y	-2.109
9	ARM4-LEFT	L	X	1.185
10	ARM4-RIGHT	L	X	.607
11	ARM3-LEFT	L	X	2.349
12	ARM3-RIGHT	L	X	2.349
13	ARM2-RIGHT	L	X	2.349
14	ARM2-LEFT	L	X	2.349
15	ARM1-LEFT	L	X	2.349
16	ARM1-RIGHT	L	X	2.349

Joint Loads and Enforced Displacements (BLC 10 : z-direction NESC Heavy Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-1.973

Joint Loads and Enforced Displacements (BLC 10 : z-direction NESC Heavy Wire Lo) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
2	ARM4-RIGHT	L	Y	-1.202
3	ARM3-LEFT	L	Y	-4.759
4	ARM3-RIGHT	L	Y	-4.759
5	ARM2-LEFT	L	Y	-4.759
6	ARM2-RIGHT	L	Y	-4.759
7	ARM1-LEFT	L	Y	-4.759
8	ARM1-RIGHT	L	Y	-4.759

Joint Loads and Enforced Displacements (BLC 11 : z-direction NESC Extreme Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-.675
2	ARM4-RIGHT	L	Y	-.329
3	ARM3-LEFT	L	Y	-2.109
4	ARM3-RIGHT	L	Y	-2.109
5	ARM2-LEFT	L	Y	-2.109
6	ARM2-RIGHT	L	Y	-2.109
7	ARM1-LEFT	L	Y	-2.109
8	ARM1-RIGHT	L	Y	-2.109

Joint Loads and Enforced Displacements (BLC 12 : x-direction NESC Heavy Mast Reac)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	3.357
2	TOP-BRACE	L	Y	-.026
3	TOP-BRACE	L	Z	1.152
4	TOP-BRACE	L	My	5.035
5	BOTTOM-BRACE	L	X	-1.739
6	BOTTOM-BRACE	L	Y	-6.943
7	BOTTOM-BRACE	L	Z	-1.152
8	BOTTOM-BRACE	L	My	-2.61
9	N18	L	X	.254
10	N19	L	X	.174
11	N18	L	Y	-1.119
12	N19	L	Y	-.531
13	N18	L	Mz	-.831
14	N19	L	Mz	-.831

Joint Loads and Enforced Displacements (BLC 13 : x-direction NESC Extreme Mast Re)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	13.661
2	TOP-BRACE	L	Y	-.017
3	TOP-BRACE	L	Z	.573
4	TOP-BRACE	L	My	20.49
5	BOTTOM-BRACE	L	X	-7.201
6	BOTTOM-BRACE	L	Y	-3.454
7	BOTTOM-BRACE	L	Z	-.573
8	BOTTOM-BRACE	L	My	-10.802
9	N18	L	X	.765
10	N19	L	X	.527
11	N18	L	Y	-.526
12	N19	L	Y	-.248

Joint Loads and Enforced Displacements (BLC 13 : x-direction NESC Extreme Mast Re) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
13	N18	L	Mz	-.473
14	N19	L	Mz	-.473

Joint Loads and Enforced Displacements (BLC 14 : z-direction NESC Heavy Mast Reac)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	0
2	TOP-BRACE	L	Y	-.03
3	TOP-BRACE	L	Z	4.507
4	TOP-BRACE	L	My	0
5	BOTTOM-BRACE	L	X	0
6	BOTTOM-BRACE	L	Y	-6.939
7	BOTTOM-BRACE	L	Z	-2.89
8	BOTTOM-BRACE	L	My	0
9	N18	L	Z	.267
10	N19	L	Z	.267
11	N18	L	X	.268
12	N19	L	X	-.268
13	N18	L	Y	-1.086
14	N19	L	Y	-.564
15	N18	L	Mz	.798
16	N19	L	Mz	.798

Joint Loads and Enforced Displacements (BLC 15 : z-direction NESC Extreme Mast Re)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	0
2	TOP-BRACE	L	Y	-.008
3	TOP-BRACE	L	Z	14.232
4	TOP-BRACE	L	My	0
5	BOTTOM-BRACE	L	X	0
6	BOTTOM-BRACE	L	Y	-3.463
7	BOTTOM-BRACE	L	Z	-7.772
8	BOTTOM-BRACE	L	My	0
9	N18	L	Z	.81
10	N19	L	Z	.81
11	N18	L	X	.812
12	N19	L	X	-.812
13	N18	L	Y	-.421
14	N19	L	Y	-.353
15	N18	L	Mz	.369
16	N19	L	Mz	.369

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.032	-.031	0	0
2	M9	Y	-.004	-.006	0	0
3	M8	Y	-.004	-.006	0	0
4	M6	Y	-.004	-.007	0	0
5	M7	Y	-.004	-.007	0	0
6	M3	Y	-.004	-.007	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
7	M2	Y	-.004	-.007	0	0
8	M4	Y	-.004	-.008	0	0
9	M5	Y	-.004	-.008	0	0
10	M11	Y	-.031	-.031	0	0
11	M12	Y	-.031	-.03	0	0
12	M13	Y	-.03	-.03	0	0
13	M14	Y	-.03	-.029	0	0
14	M15	Y	-.029	-.029	0	0
15	M16	Y	-.029	-.028	0	0
16	M17	Y	-.028	-.028	0	0
17	M18	Y	-.028	-.027	0	0
18	M19	Y	-.027	-.027	0	0
19	M20	Y	-.027	-.026	0	0
20	M21	Y	-.026	-.026	0	0
21	M22	Y	-.026	-.025	0	0
22	M23	Y	-.025	-.025	0	0
23	M24	Y	-.025	-.024	0	0
24	M25	Y	-.024	-.023	0	0
25	M26	Y	-.023	-.023	0	0
26	M27	Y	-.023	-.022	0	0
27	M28	Y	-.022	-.022	0	0
28	M29	Y	-.022	-.021	0	0
29	M30	Y	-.021	-.021	0	0
30	M31	Y	-.021	-.02	0	0
31	M32	Y	-.02	-.02	0	0
32	M33	Y	-.02	-.019	0	0
33	M34	Y	-.019	-.019	0	0
34	M35	Y	-.019	-.018	0	0
35	M36	Y	-.018	-.018	0	0
36	M37	Y	-.018	-.017	0	0
37	M38	Y	-.017	-.017	0	0
38	M39	Y	-.017	-.016	0	0
39	M40	Y	-.007	-.01	0	0
40	M41	Y	-.007	-.01	0	0
41	M42	Y	-.008	-.012	0	0
42	M43	Y	-.008	-.012	0	0
43	M44	Y	-.007	-.01	0	0
44	M45	Y	-.007	-.01	0	0
45	M46	Y	-.006	-.008	0	0
46	M47	Y	-.006	-.008	0	0

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.012	.012	0	0
2	M11	X	.012	.012	0	0
3	M12	X	.012	.012	0	0
4	M13	X	.012	.012	0	0
5	M14	X	.012	.012	0	0
6	M15	X	.012	.012	0	0
7	M16	X	.012	.012	0	0
8	M17	X	.012	.012	0	0

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
9	M18	X	.012	.012	0	0
10	M19	X	.012	.012	0	0
11	M20	X	.012	.012	0	0
12	M21	X	.012	.012	0	0
13	M22	X	.012	.012	0	0
14	M23	X	.012	.012	0	0
15	M24	X	.012	.012	0	0
16	M25	X	.012	.012	0	0
17	M26	X	.012	.012	0	0
18	M27	X	.012	.012	0	0
19	M28	X	.012	.012	0	0
20	M29	X	.012	.012	0	0
21	M30	X	.012	.012	0	0
22	M31	X	.012	.012	0	0
23	M32	X	.012	.012	0	0
24	M33	X	.012	.012	0	0
25	M34	X	.012	.012	0	0
26	M35	X	.012	.012	0	0
27	M36	X	.012	.012	0	0
28	M37	X	.012	.012	0	0
29	M38	X	.012	.012	0	0
30	M39	X	.012	.012	0	0

Member Distributed Loads (BLC 5 : x-direction NESC Extreme Wind on)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.095	.095	0	0
2	M11	X	.095	.095	0	0
3	M12	X	.095	.095	0	0
4	M13	X	.095	.095	0	0
5	M14	X	.095	.095	0	0
6	M15	X	.095	.095	0	0
7	M16	X	.095	.095	0	0
8	M17	X	.095	.095	0	0
9	M18	X	.095	.095	0	0
10	M19	X	.095	.095	0	0
11	M20	X	.095	.095	0	0
12	M21	X	.095	.095	0	0
13	M22	X	.094	.094	0	0
14	M23	X	.094	.094	0	0
15	M24	X	.094	.094	0	0
16	M25	X	.094	.094	0	0
17	M26	X	.094	.094	0	0
18	M27	X	.094	.094	0	0
19	M28	X	.093	.093	0	0
20	M29	X	.093	.093	0	0
21	M30	X	.093	.093	0	0
22	M31	X	.093	.093	0	0
23	M32	X	.093	.093	0	0
24	M33	X	.093	.093	0	0
25	M34	X	.092	.092	0	0
26	M35	X	.092	.092	0	0

Member Distributed Loads (BLC 5 : x-direction NESC Extreme Wind on) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
27	M36	X	.092	.092	0	0
28	M37	X	.092	.092	0	0
29	M38	X	.092	.092	0	0
30	M39	X	.092	.092	0	0

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.028	0	0
2	M8	Z	.003	.005	0	0
3	M9	Z	.003	.005	0	0
4	M7	Z	.003	.006	0	0
5	M6	Z	.003	.006	0	0
6	M3	Z	.003	.006	0	0
7	M2	Z	.003	.006	0	0
8	M5	Z	.003	.006	0	0
9	M4	Z	.003	.006	0	0
10	M11	Z	.028	.028	0	0
11	M12	Z	.028	.027	0	0
12	M13	Z	.027	.026	0	0
13	M14	Z	.026	.025	0	0
14	M15	Z	.025	.025	0	0
15	M16	Z	.025	.024	0	0
16	M17	Z	.024	.023	0	0
17	M18	Z	.023	.022	0	0
18	M19	Z	.022	.022	0	0
19	M20	Z	.022	.021	0	0
20	M21	Z	.021	.02	0	0
21	M22	Z	.02	.019	0	0
22	M23	Z	.019	.019	0	0
23	M24	Z	.019	.018	0	0
24	M25	Z	.018	.017	0	0
25	M26	Z	.017	.017	0	0
26	M27	Z	.017	.016	0	0
27	M28	Z	.016	.015	0	0
28	M29	Z	.015	.014	0	0
29	M30	Z	.014	.014	0	0
30	M31	Z	.014	.013	0	0
31	M32	Z	.013	.012	0	0
32	M33	Z	.012	.011	0	0
33	M34	Z	.011	.011	0	0
34	M35	Z	.011	.01	0	0
35	M36	Z	.01	.009	0	0
36	M37	Z	.009	.008	0	0
37	M38	Z	.008	.008	0	0
38	M39	Z	.008	.007	0	0
39	M40	Z	.006	.009	0	0
40	M41	Z	.006	.009	0	0
41	M42	Z	.006	.01	0	0
42	M43	Z	.006	.01	0	0
43	M44	Z	.006	.009	0	0
44	M45	Z	.006	.009	0	0

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
45	M46	Z	.005	.007	0	0
46	M47	Z	.005	.007	0	0

Member Distributed Loads (BLC 7 : z-direction NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.236	.23	0	0
2	M8	Z	.018	.035	0	0
3	M9	Z	.018	.035	0	0
4	M7	Z	.018	.042	0	0
5	M6	Z	.018	.042	0	0
6	M2	Z	.018	.042	0	0
7	M3	Z	.018	.042	0	0
8	M5	Z	.018	.049	0	0
9	M4	Z	.018	.049	0	0
10	M11	Z	.23	.224	0	0
11	M12	Z	.224	.218	0	0
12	M13	Z	.218	.212	0	0
13	M14	Z	.212	.206	0	0
14	M15	Z	.206	.2	0	0
15	M16	Z	.2	.194	0	0
16	M17	Z	.194	.188	0	0
17	M18	Z	.188	.182	0	0
18	M19	Z	.182	.176	0	0
19	M20	Z	.176	.17	0	0
20	M21	Z	.17	.164	0	0
21	M22	Z	.164	.158	0	0
22	M23	Z	.158	.152	0	0
23	M24	Z	.152	.146	0	0
24	M25	Z	.146	.141	0	0
25	M26	Z	.141	.135	0	0
26	M27	Z	.135	.129	0	0
27	M28	Z	.129	.123	0	0
28	M29	Z	.123	.117	0	0
29	M30	Z	.117	.111	0	0
30	M31	Z	.111	.105	0	0
31	M32	Z	.105	.099	0	0
32	M33	Z	.099	.093	0	0
33	M34	Z	.093	.087	0	0
34	M35	Z	.087	.081	0	0
35	M36	Z	.081	.075	0	0
36	M37	Z	.075	.069	0	0
37	M38	Z	.069	.063	0	0
38	M39	Z	.063	.057	0	0
39	M40	Z	.042	.066	0	0
40	M41	Z	.042	.066	0	0
41	M42	Z	.049	.079	0	0
42	M43	Z	.049	.079	0	0
43	M44	Z	.042	.066	0	0
44	M45	Z	.042	.066	0	0
45	M46	Z	.035	.053	0	0
46	M47	Z	.035	.053	0	0

Member Distributed Loads (BLC 16 : Weight of Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.027	-.027	0	0
2	M28	Y	-.025	-.025	0	0
3	M11	Y	-.027	-.027	0	0
4	M12	Y	-.027	-.027	0	0
5	M13	Y	-.027	-.027	0	0
6	M14	Y	-.027	-.027	0	0
7	M15	Y	-.027	-.027	0	0
8	M16	Y	-.027	-.027	0	0
9	M17	Y	-.027	-.027	0	0
10	M18	Y	-.027	-.027	0	0
11	M19	Y	-.027	-.027	0	0
12	M20	Y	-.027	-.027	0	0
13	M21	Y	-.027	-.027	0	0
14	M22	Y	-.027	-.027	0	0
15	M23	Y	-.027	-.027	0	0
16	M24	Y	-.027	-.027	0	0
17	M25	Y	-.027	-.027	0	0
18	M26	Y	-.027	-.027	0	0
19	M27	Y	-.027	-.027	0	5
20	M29	Y	-.025	-.025	0	0
21	M30	Y	-.025	-.025	0	0
22	M31	Y	-.025	-.025	0	0
23	M32	Y	-.025	-.025	0	0
24	M33	Y	-.025	-.025	0	0
25	M34	Y	-.025	-.025	0	0
26	M35	Y	-.025	-.025	0	0
27	M36	Y	-.025	-.025	0	0
28	M37	Y	-.025	-.025	0	0
29	M38	Y	-.025	-.025	0	0
30	M39	Y	-.025	-.025	0	5

Member Distributed Loads (BLC 17 : Weight of Ice on Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.039	-.039	0	0
2	M28	Y	-.036	-.036	0	0
3	M11	Y	-.039	-.039	0	0
4	M12	Y	-.039	-.039	0	0
5	M13	Y	-.039	-.039	0	0
6	M14	Y	-.039	-.039	0	0
7	M15	Y	-.039	-.039	0	0
8	M16	Y	-.039	-.039	0	0
9	M17	Y	-.039	-.039	0	0
10	M18	Y	-.039	-.039	0	0
11	M19	Y	-.039	-.039	0	0
12	M20	Y	-.039	-.039	0	0
13	M21	Y	-.039	-.039	0	0
14	M22	Y	-.039	-.039	0	0
15	M23	Y	-.039	-.039	0	0
16	M24	Y	-.039	-.039	0	0
17	M25	Y	-.039	-.039	0	0
18	M26	Y	-.039	-.039	0	0

Member Distributed Loads (BLC 17 : Weight of Ice on Coax Cables) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
19	M27	Y	-.039	-.039	0	5
20	M29	Y	-.036	-.036	0	0
21	M30	Y	-.036	-.036	0	0
22	M31	Y	-.036	-.036	0	0
23	M32	Y	-.036	-.036	0	0
24	M33	Y	-.036	-.036	0	0
25	M34	Y	-.036	-.036	0	0
26	M35	Y	-.036	-.036	0	0
27	M36	Y	-.036	-.036	0	0
28	M37	Y	-.036	-.036	0	0
29	M38	Y	-.036	-.036	0	0
30	M39	Y	-.036	-.036	0	5

Member Distributed Loads (BLC 18 : x-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.003	.003	0	0
2	M11	X	.003	.003	0	0
3	M12	X	.003	.003	0	0
4	M13	X	.003	.003	0	0
5	M14	X	.003	.003	0	0
6	M15	X	.003	.003	0	0
7	M16	X	.003	.003	0	0
8	M17	X	.003	.003	0	0
9	M18	X	.003	.003	0	0
10	M19	X	.003	.003	0	0
11	M20	X	.003	.003	0	0
12	M21	X	.003	.003	0	0
13	M22	X	.003	.003	0	0
14	M23	X	.003	.003	0	0
15	M24	X	.003	.003	0	0
16	M25	X	.003	.003	0	0
17	M26	X	.003	.003	0	0
18	M27	X	.003	.003	0	0
19	M28	X	.003	.003	0	0
20	M29	X	.003	.003	0	0
21	M30	X	.003	.003	0	0
22	M31	X	.003	.003	0	0
23	M32	X	.003	.003	0	0
24	M33	X	.003	.003	0	0
25	M34	X	.003	.003	0	0
26	M35	X	.003	.003	0	0
27	M36	X	.003	.003	0	0
28	M37	X	.003	.003	0	0
29	M38	X	.003	.003	0	0
30	M39	X	.003	.003	0	5

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.017	.017	0	0
2	M11	X	.017	.017	0	0
3	M12	X	.017	.017	0	0

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
4	M13	X	.017	.017	0	0
5	M14	X	.017	.017	0	0
6	M15	X	.017	.017	0	0
7	M16	X	.017	.017	0	0
8	M17	X	.017	.017	0	0
9	M18	X	.017	.017	0	0
10	M19	X	.017	.017	0	0
11	M20	X	.017	.017	0	0
12	M21	X	.017	.017	0	0
13	M22	X	.017	.017	0	0
14	M23	X	.017	.017	0	0
15	M24	X	.017	.017	0	0
16	M25	X	.017	.017	0	0
17	M26	X	.017	.017	0	0
18	M27	X	.017	.017	0	0
19	M28	X	.017	.017	0	0
20	M29	X	.017	.017	0	0
21	M30	X	.017	.017	0	0
22	M31	X	.017	.017	0	0
23	M32	X	.017	.017	0	0
24	M33	X	.017	.017	0	0
25	M34	X	.017	.017	0	0
26	M35	X	.017	.017	0	0
27	M36	X	.017	.017	0	0
28	M37	X	.017	.017	0	0
29	M38	X	.017	.017	0	0
30	M39	X	.017	.017	0	5

Member Distributed Loads (BLC 20 : z-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.003	.003	0	0
2	M11	Z	.003	.003	0	0
3	M12	Z	.003	.003	0	0
4	M13	Z	.003	.003	0	0
5	M14	Z	.003	.003	0	0
6	M15	Z	.003	.003	0	0
7	M16	Z	.003	.003	0	0
8	M17	Z	.003	.003	0	0
9	M18	Z	.003	.003	0	0
10	M19	Z	.003	.003	0	0
11	M20	Z	.003	.003	0	0
12	M21	Z	.003	.003	0	0
13	M22	Z	.003	.003	0	0
14	M23	Z	.003	.003	0	0
15	M24	Z	.003	.003	0	0
16	M25	Z	.003	.003	0	0
17	M26	Z	.003	.003	0	0
18	M27	Z	.003	.003	0	0
19	M28	Z	.003	.003	0	0
20	M29	Z	.003	.003	0	0
21	M30	Z	.003	.003	0	0

Member Distributed Loads (BLC 20 : z-direction NESC Heavy Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
22	M31	Z	.003	.003	0	0
23	M32	Z	.003	.003	0	0
24	M33	Z	.003	.003	0	0
25	M34	Z	.003	.003	0	0
26	M35	Z	.003	.003	0	0
27	M36	Z	.003	.003	0	0
28	M37	Z	.003	.003	0	0
29	M38	Z	.003	.003	0	0
30	M39	Z	.003	.003	0	5

Member Distributed Loads (BLC 21 : z-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.017	.017	0	0
2	M11	Z	.017	.017	0	0
3	M12	Z	.017	.017	0	0
4	M13	Z	.017	.017	0	0
5	M14	Z	.017	.017	0	0
6	M15	Z	.017	.017	0	0
7	M16	Z	.017	.017	0	0
8	M17	Z	.017	.017	0	0
9	M18	Z	.017	.017	0	0
10	M19	Z	.017	.017	0	0
11	M20	Z	.017	.017	0	0
12	M21	Z	.017	.017	0	0
13	M22	Z	.017	.017	0	0
14	M23	Z	.017	.017	0	0
15	M24	Z	.017	.017	0	0
16	M25	Z	.017	.017	0	0
17	M26	Z	.017	.017	0	0
18	M27	Z	.017	.017	0	0
19	M28	Z	.017	.017	0	0
20	M29	Z	.017	.017	0	0
21	M30	Z	.017	.017	0	0
22	M31	Z	.017	.017	0	0
23	M32	Z	.017	.017	0	0
24	M33	Z	.017	.017	0	0
25	M34	Z	.017	.017	0	0
26	M35	Z	.017	.017	0	0
27	M36	Z	.017	.017	0	0
28	M37	Z	.017	.017	0	0
29	M38	Z	.017	.017	0	0
30	M39	Z	.017	.017	0	5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight Pole and Arms	None								
3	Weight of Ice Only on Pole and A	None						46		
4	x-direction NESC Heavy Wind on P	None						30		
5	x-direction NESC Extreme Wind on	None						30		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
6	z-direction NESC Heavy Wind	None						46		
7	z-direction NESC Extreme Wind	None						46		
8	x-direction NESC Heavy Wire Load	None				16				
9	x-driection NESC Extreme Wire Lo	None				16				
10	z-direction NESC Heavy Wire Lo	None				8				
11	z-direction NESC Extreme Wire Lo	None				8				
12	x-direction NESC Heavy Mast Reac	None				14				
13	x-direction NESC Extreme Mast Re	None				14				
14	z-direction NESC Heavy Mast Reac	None				16				
15	z-direction NESC Extreme Mast Re	None				16				
16	Weight of Coax Cables	None						30		
17	Weight of Ice on Coax Cables	None						30		
18	x-direction NESC Heavy Coax	None						30		
19	x-direction NESC Extreme Coax	None						30		
20	z-direction NESC Heavy Coax	None						30		
21	z-direction NESC Extreme Coax	None						30		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-direction NESC Heavy...	Yes	Y		1	1.5	3	1.5	4	2.5	8	1	12	1	16	1.5	17	1.5	18	2.5				
2	x-direction NESC Extre...	Yes	Y		1	1	5	1	9	1	13	1	16	1	19	1								
3	z-direction NESC Heavy...	Yes	Y		1	1.5	3	1.5	6	2.5	10	1	14	1	16	1.5	17	1.5	20	2.5				
4	z-direction NESC Extre...	Yes	Y		1	1	7	1	11	1	15	1	16	1	21	1								

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-POLE	max	0	4	104.508	3	0	2	-7.107	2	-.546	3	4787.518	2
2		min	-40.258	2	50.911	2	-35.597	4	-3541.86	4	-10.045	2	-7.737	3
3	Totals:	max	0	4	104.508	3	0	2						
4		min	-40.258	2	50.911	2	-35.597	4						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-POLE	-22.523	104.508	0	-20.122	-2.595	3151.144
2	1	Totals:	-22.523	104.508	0			
3	1	COG (ft):	X: -.041	Y: 94.066	Z: .006			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	1	M28	1	1.52	-.006	-1.571	.585	-.585	42.295	-42.295
2			2	1.51	-.006	-1.568	.581	-.581	41.151	-41.151
3			3	1.499	-.006	-1.565	.576	-.576	40.01	-40.01
4			4	1.489	-.006	-1.562	.572	-.572	38.871	-38.871
5			5	1.479	-.006	-1.559	.568	-.568	37.735	-37.735
6	1	M22	1	1.39	-.005	-.832	.484	-.484	41.916	-41.916
7			2	1.381	-.005	-.831	.482	-.482	41.222	-41.222
8			3	1.371	-.005	-.829	.48	-.48	40.531	-40.531
9			4	1.362	-.005	-.827	.477	-.477	39.84	-39.84
10			5	1.352	-.005	-.826	.475	-.475	39.151	-39.151
11	1	M23	1	1.378	-.005	-.866	.487	-.487	41.562	-41.562
12			2	1.369	-.005	-.864	.484	-.484	40.825	-40.825
13			3	1.359	-.005	-.862	.482	-.482	40.089	-40.089
14			4	1.349	-.005	-.86	.479	-.479	39.354	-39.354
15			5	1.34	-.005	-.859	.476	-.476	38.621	-38.621
16	1	M24	1	1.366	-.005	-.901	.488	-.488	41.109	-41.109
17			2	1.357	-.005	-.899	.486	-.486	40.323	-40.323
18			3	1.347	-.005	-.897	.483	-.483	39.538	-39.538
19			4	1.337	-.005	-.896	.48	-.48	38.755	-38.755
20			5	1.328	-.005	-.894	.477	-.477	37.973	-37.973
21	1	M29	1	1.505	-.006	-1.65	.581	-.581	40.833	-40.833
22			2	1.494	-.006	-1.646	.576	-.576	39.594	-39.594
23			3	1.484	-.006	-1.643	.571	-.571	38.358	-38.358
24			4	1.474	-.006	-1.64	.567	-.567	37.124	-37.124
25			5	1.463	-.006	-1.636	.562	-.562	35.893	-35.893
26	1	M25	1	1.355	-.005	-.939	.49	-.49	40.537	-40.537
27			2	1.345	-.005	-.937	.487	-.487	39.697	-39.697
28			3	1.335	-.005	-.935	.484	-.484	38.858	-38.858
29			4	1.326	-.005	-.933	.481	-.481	38.021	-38.021
30			5	1.316	-.005	-.932	.478	-.478	37.186	-37.186
31	1	M17	1	1.336	-.003	-.597	.418	-.418	40.135	-40.135
32			2	1.327	-.003	-.595	.417	-.417	39.64	-39.64
33			3	1.318	-.003	-.594	.416	-.416	39.147	-39.147
34			4	1.309	-.003	-.593	.414	-.414	38.655	-38.655
35			5	1.3	-.003	-.592	.413	-.413	38.163	-38.163
36	1	M18	1	1.324	-.003	-.617	.423	-.423	40.128	-40.128
37			2	1.315	-.003	-.616	.421	-.421	39.607	-39.607
38			3	1.306	-.003	-.615	.42	-.42	39.087	-39.087
39			4	1.297	-.003	-.613	.418	-.418	38.567	-38.567
40			5	1.288	-.003	-.612	.417	-.417	38.049	-38.049
41	1	M16	1	1.348	-.003	-.577	.413	-.413	40.103	-40.103
42			2	1.339	-.003	-.576	.412	-.412	39.634	-39.634
43			3	1.33	-.003	-.575	.411	-.411	39.165	-39.165

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.321	-.003	-.573	.41	-.41	38.698	-38.698
45			5	1.312	-.003	-.572	.409	-.409	38.231	-38.231
46	1	M19	1	1.312	-.004	-.639	.427	-.427	40.079	-40.079
47			2	1.303	-.004	-.638	.425	-.425	39.528	-39.528
48			3	1.294	-.004	-.636	.424	-.424	38.979	-38.979
49			4	1.285	-.004	-.635	.422	-.422	38.431	-38.431
50			5	1.276	-.004	-.634	.421	-.421	37.884	-37.884
51	1	M20	1	1.301	-.004	-.662	.431	-.431	39.98	-39.98
52			2	1.292	-.004	-.661	.429	-.429	39.398	-39.398
53			3	1.282	-.004	-.659	.427	-.427	38.817	-38.817
54			4	1.273	-.004	-.658	.425	-.425	38.237	-38.237
55			5	1.264	-.004	-.657	.424	-.424	37.659	-37.659
56	1	M26	1	1.343	-.006	-.98	.49	-.49	39.824	-39.824
57			2	1.333	-.006	-.978	.487	-.487	38.923	-38.923
58			3	1.323	-.006	-.976	.484	-.484	38.024	-38.024
59			4	1.314	-.006	-.974	.481	-.481	37.127	-37.127
60			5	1.304	-.006	-.972	.477	-.477	36.232	-36.232
61	1	M21	1	1.289	-.004	-.686	.434	-.434	39.824	-39.824
62			2	1.28	-.004	-.685	.432	-.432	39.207	-39.207
63			3	1.271	-.004	-.684	.43	-.43	38.591	-38.591
64			4	1.261	-.004	-.682	.428	-.428	37.977	-37.977
65			5	1.252	-.004	-.681	.426	-.426	37.364	-37.364
66	1	M30	1	1.489	-.007	-1.735	.575	-.575	39.04	-39.04
67			2	1.479	-.007	-1.732	.57	-.57	37.692	-37.692
68			3	1.468	-.007	-1.728	.565	-.565	36.347	-36.347
69			4	1.458	-.007	-1.725	.56	-.56	35.004	-35.004
70			5	1.448	-.007	-1.721	.555	-.555	33.664	-33.664
71	1	M27	1	1.331	-.006	-1.023	.49	-.49	38.941	-38.941
72			2	1.322	-.006	-1.021	.487	-.487	37.973	-37.973
73			3	1.312	-.006	-1.019	.484	-.484	37.007	-37.007
74			4	1.302	-.006	-1.017	.48	-.48	36.042	-36.042
75			5	1.258	-.006	-.996	.459	-.459	35.029	-35.029
76	1	M15	1	1.253	-.002	-.489	.37	-.37	37.79	-37.79
77			2	1.244	-.002	-.488	.369	-.369	37.369	-37.369
78			3	1.235	-.002	-.487	.368	-.368	36.948	-36.948
79			4	1.226	-.002	-.486	.367	-.367	36.528	-36.528
80			5	1.217	-.002	-.485	.366	-.366	36.11	-36.11
81	1	M14	1	1.265	-.002	-.473	.364	-.364	37.659	-37.659
82			2	1.256	-.002	-.472	.363	-.363	37.258	-37.258
83			3	1.247	-.002	-.471	.363	-.363	36.858	-36.858
84			4	1.238	-.002	-.47	.362	-.362	36.458	-36.458
85			5	1.23	-.002	-.469	.362	-.362	36.06	-36.06
86	1	M13	1	1.277	-.001	-.46	.358	-.358	37.537	-37.537
87			2	1.268	-.001	-.459	.358	-.358	37.154	-37.154
88			3	1.259	-.001	-.458	.357	-.357	36.773	-36.773
89			4	1.251	-.001	-.457	.357	-.357	36.392	-36.392
90			5	1.242	-.001	-.456	.356	-.356	36.012	-36.012
91	1	M12	1	1.289	-.001	-.446	.352	-.352	37.38	-37.38
92			2	1.28	-.001	-.445	.352	-.352	37.015	-37.015
93			3	1.272	-.001	-.444	.352	-.352	36.651	-36.651
94			4	1.263	-.001	-.443	.351	-.351	36.288	-36.288
95			5	1.254	-.001	-.442	.351	-.351	35.926	-35.926

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	1	M11	1	1.301	0	-.433	.346	-.346	37.206	-37.206
97			2	1.293	0	-.432	.346	-.346	36.858	-36.858
98			3	1.284	0	-.431	.346	-.346	36.511	-36.511
99			4	1.275	0	-.43	.345	-.345	36.164	-36.164
100			5	1.266	0	-.429	.345	-.345	35.818	-35.818
101	1	M1	1	1.314	0	-.42	.339	-.339	37.018	-37.018
102			2	1.305	0	-.419	.339	-.339	36.685	-36.685
103			3	1.296	0	-.418	.339	-.339	36.353	-36.353
104			4	1.288	0	-.417	.339	-.339	36.022	-36.022
105			5	1.279	0	-.416	.339	-.339	35.691	-35.691
106	1	M31	1	1.474	-.007	-1.828	.569	-.569	36.831	-36.831
107			2	1.463	-.007	-1.824	.564	-.564	35.357	-35.357
108			3	1.453	-.007	-1.821	.558	-.558	33.886	-33.886
109			4	1.442	-.007	-1.817	.553	-.553	32.418	-32.418
110			5	1.432	-.007	-1.813	.548	-.548	30.953	-30.953
111	1	M32	1	1.458	-.007	-1.93	.562	-.562	34.094	-34.094
112			2	1.448	-.007	-1.926	.556	-.556	32.473	-32.473
113			3	1.437	-.007	-1.922	.55	-.55	30.855	-30.855
114			4	1.427	-.007	-1.918	.545	-.545	29.24	-29.24
115			5	1.416	-.007	-1.914	.539	-.539	27.629	-27.629
116	1	M33	1	1.443	-.007	-2.039	.553	-.553	30.672	-30.672
117			2	1.432	-.007	-2.035	.547	-.547	28.878	-28.878
118			3	1.422	-.007	-2.031	.541	-.541	27.088	-27.088
119			4	1.123	-.006	-1.573	.535	-.535	24.963	-24.963
120			5	1.112	-.006	-1.568	.531	-.531	23.58	-23.58
121	1	M34	1	1.222	-.006	-2.225	.605	-.605	27.936	-27.936
122			2	1.211	-.006	-2.219	.599	-.599	26.299	-26.299
123			3	1.2	-.006	-2.213	.594	-.594	24.667	-24.667
124			4	1.19	-.006	-2.207	.588	-.588	23.039	-23.039
125			5	1.179	-.006	-2.201	.583	-.583	21.415	-21.415
126	1	M35	1	1.197	-.006	-2.356	.596	-.596	24.245	-24.245
127			2	1.186	-.006	-2.35	.591	-.591	22.409	-22.409
128			3	1.175	-.006	-2.344	.585	-.585	20.578	-20.578
129			4	1.164	-.006	-2.337	.579	-.579	18.751	-18.751
130			5	1.153	-.006	-2.331	.574	-.574	16.93	-16.93
131	1	M36	1	1.172	-.006	-2.503	.587	-.587	19.425	-19.425
132			2	.817	-.004	-1.722	.582	-.582	17.068	-17.068
133			3	.806	-.004	-1.716	.578	-.578	15.635	-15.635
134			4	.795	-.004	-1.709	.574	-.574	14.208	-14.208
135			5	.784	-.004	-1.702	.57	-.57	12.786	-12.786
136	1	M37	1	.797	-.004	-1.828	.583	-.583	14.911	-14.911
137			2	.786	-.004	-1.821	.579	-.579	13.268	-13.268
138			3	.775	-.004	-1.814	.575	-.575	11.631	-11.631
139			4	.546	-.081	-1.943	.525	-.525	9.927	-9.927
140			5	.536	-.081	-1.936	.445	-.445	8.181	-8.181
141	1	M38	1	.544	-.081	-2.094	.455	-.455	9.736	-9.736
142			2	.533	-.081	-2.086	.373	-.373	7.675	-7.675
143			3	.522	-.081	-2.078	.291	-.291	5.622	-5.622
144			4	.174	-.079	-1.153	.21	-.21	3.552	-3.552
145			5	.163	-.079	-1.145	.13	-.13	2.419	-2.419
146	1	M39	1	.166	-.079	-1.241	.133	-.133	2.953	-2.953
147			2	.155	-.079	-1.232	.051	-.051	1.594	-1.594

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.143	0	-.589	.001	-.001	.524	-.524
149			4	.132	0	-.58	0	0	-.119	.119
150			5	0	0	-.003	0	0	0	0
151	1	M6	1	.337	-.865	.001	0	0	0	0
152			2	.338	-.876	.001	-2.433	2.433	.003	-.003
153			3	.339	-.886	.001	-4.897	4.897	.007	-.007
154			4	.34	-.898	.001	-7.392	7.392	.01	-.01
155			5	.341	-.909	.001	-9.918	9.918	.014	-.014
156	1	M44	1	.223	-.575	.001	-4.131	4.131	.006	-.006
157			2	.224	-.585	.001	-5.198	5.198	.008	-.008
158			3	.225	-.596	.001	-6.284	6.284	.009	-.009
159			4	.226	-.607	.001	-7.389	7.389	.011	-.011
160			5	.227	-.618	.001	-8.515	8.515	.012	-.012
161	1	M9	1	.256	-.388	.001	0	0	0	0
162			2	.256	-.395	.001	-.839	.839	.002	-.002
163			3	.257	-.402	.001	-1.692	1.692	.005	-.005
164			4	.257	-.41	.001	-2.562	2.562	.007	-.007
165			5	.258	-.417	.001	-3.447	3.447	.01	-.01
166	1	M47	1	.179	-.277	0	-1.608	1.608	.005	-.005
167			2	.179	-.284	0	-2.029	2.029	.006	-.006
168			3	.18	-.291	0	-2.46	2.46	.007	-.007
169			4	.18	-.298	0	-2.901	2.901	.008	-.008
170			5	.181	-.305	0	-3.354	3.354	.01	-.01
171	1	M4	1	.282	-.762	0	0	0	0	0
172			2	.283	-.775	0	-2.415	2.415	.002	-.002
173			3	.284	-.79	0	-4.874	4.874	.004	-.004
174			4	.285	-.804	0	-7.378	7.378	.007	-.007
175			5	.286	-.819	0	-9.928	9.928	.009	-.009
176	1	M2	1	.335	-.878	0	0	0	0	0
177			2	.336	-.889	0	-2.546	2.546	.002	-.002
178			3	.337	-.9	0	-5.125	5.125	.004	-.004
179			4	.338	-.912	0	-7.736	7.736	.006	-.006
180			5	.339	-.924	0	-10.381	10.381	.008	-.008
181	1	M42	1	.18	-.499	0	-3.824	3.824	.004	-.004
182			2	.181	-.513	0	-4.827	4.827	.004	-.004
183			3	.182	-.527	0	-5.857	5.857	.005	-.005
184			4	.183	-.541	0	-6.915	6.915	.006	-.006
185			5	.184	-.556	0	-8.002	8.002	.007	-.007
186	1	M40	1	.221	-.584	0	-4.324	4.324	.003	-.003
187			2	.222	-.595	0	-5.441	5.441	.004	-.004
188			3	.223	-.606	0	-6.579	6.579	.005	-.005
189			4	.224	-.617	0	-7.738	7.738	.006	-.006
190			5	.225	-.628	0	-8.918	8.918	.007	-.007
191	1	M3	1	-.172	-1.022	0	0	0	0	0
192			2	-.171	-1.033	0	-2.961	2.961	0	0
193			3	-.17	-1.044	0	-5.954	5.954	0	0
194			4	-.169	-1.056	0	-8.98	8.98	-.001	.001
195			5	-.168	-1.068	0	-12.04	12.04	-.002	.002
196	1	M5	1	-.157	-.874	0	0	0	0	0
197			2	-.156	-.888	0	-2.768	2.768	0	0
198			3	-.155	-.902	0	-5.581	5.581	-.001	.001
199			4	-.154	-.917	0	-8.438	8.438	-.002	.002

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.153	-.932	0	-11.342	11.342	-.003	.003
201	1	M7	1	-.169	-1.018	0	0	0	0	0
202			2	-.168	-1.029	0	-2.863	2.863	-.001	.001
203			3	-.167	-1.04	0	-5.756	5.756	-.002	.002
204			4	-.166	-1.051	0	-8.68	8.68	-.003	.003
205			5	-.165	-1.063	0	-11.637	11.637	-.004	.004
206	1	M8	1	-.138	-.307	0	0	0	0	0
207			2	-.137	-.314	0	-.665	.665	0	0
208			3	-.137	-.321	0	-1.346	1.346	-.002	.002
209			4	-.136	-.329	0	-2.042	2.042	-.003	.003
210			5	-.135	-.336	0	-2.754	2.754	-.003	.003
211	1	M10	1	0	0	0	0	0	0	0
212			2	0	0	0	0	0	0	0
213			3	0	0	0	0	0	0	0
214			4	0	0	0	0	0	0	0
215			5	0	0	0	0	0	0	0
216	1	M41	1	-.11	-.677	0	-5.015	5.015	0	0
217			2	-.109	-.688	0	-6.309	6.309	0	0
218			3	-.108	-.699	0	-7.623	7.623	-.001	.001
219			4	-.107	-.71	0	-8.959	8.959	-.001	.001
220			5	-.106	-.722	0	-10.316	10.316	-.001	.001
221	1	M43	1	-.096	-.57	0	-4.369	4.369	-.001	.001
222			2	-.095	-.584	0	-5.512	5.512	-.001	.001
223			3	-.094	-.598	0	-6.683	6.683	-.002	.002
224			4	-.093	-.612	0	-7.881	7.881	-.002	.002
225			5	-.092	-.627	0	-9.109	9.109	-.002	.002
226	1	M46	1	-.094	-.225	0	-1.284	1.284	-.002	.002
227			2	-.093	-.231	0	-1.626	1.626	-.002	.002
228			3	-.093	-.238	0	-1.978	1.978	-.003	.003
229			4	-.092	-.245	0	-2.34	2.34	-.003	.003
230			5	-.091	-.252	0	-2.713	2.713	-.003	.003
231	1	M45	1	-.108	-.674	0	-4.847	4.847	-.002	.002
232			2	-.107	-.685	0	-6.097	6.097	-.002	.002
233			3	-.106	-.695	0	-7.366	7.366	-.003	.003
234			4	-.105	-.706	0	-8.655	8.655	-.003	.003
235			5	-.104	-.717	0	-9.964	9.964	-.004	.004

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-POLE	-40.258	50.911	0	-7.107	-10.045	4787.518
2	2	Totals:	-40.258	50.911	0			
3	2	COG (ft):	X: -.038	Y: 90.963	Z: .005			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	2	M22	1	.653	0	-1.267	.182	-.182	59.294	-59.294
2			2	.649	0	-1.262	.181	-.181	58.24	-58.24
3			3	.644	0	-1.258	.181	-.181	57.189	-57.189
4			4	.639	0	-1.253	.18	-.18	56.143	-56.143
5			5	.634	0	-1.248	.18	-.18	55.101	-55.101
6	2	M16	1	.645	0	-.951	.148	-.148	58.707	-58.707
7			2	.64	0	-.947	.148	-.148	57.934	-57.934
8			3	.635	0	-.944	.148	-.148	57.164	-57.164
9			4	.63	0	-.94	.147	-.147	56.396	-56.396
10			5	.626	0	-.937	.147	-.147	55.632	-55.632
11	2	M23	1	.646	0	-1.3	.184	-.184	58.494	-58.494
12			2	.641	0	-1.295	.184	-.184	57.387	-57.387
13			3	.636	0	-1.29	.183	-.183	56.285	-56.285
14			4	.632	0	-1.285	.183	-.183	55.188	-55.188
15			5	.627	0	-1.28	.183	-.183	54.094	-54.094
16	2	M28	1	.703	-.001	-2.165	.236	-.236	58.445	-58.445
17			2	.698	-.001	-2.155	.235	-.235	56.872	-56.872
18			3	.693	-.001	-2.146	.235	-.235	55.305	-55.305
19			4	.688	-.001	-2.137	.234	-.234	53.745	-53.745
20			5	.683	-.001	-2.127	.233	-.233	52.192	-52.192
21	2	M17	1	.637	0	-.97	.151	-.151	58.402	-58.402
22			2	.632	0	-.967	.15	-.15	57.598	-57.598
23			3	.628	0	-.963	.15	-.15	56.798	-56.798
24			4	.623	0	-.96	.15	-.15	56	-56
25			5	.618	0	-.956	.15	-.15	55.206	-55.206
26	2	M18	1	.63	0	-.991	.153	-.153	58.048	-58.048
27			2	.625	0	-.987	.153	-.153	57.212	-57.212
28			3	.62	0	-.983	.153	-.153	56.379	-56.379
29			4	.615	0	-.98	.152	-.152	55.549	-55.549
30			5	.611	0	-.976	.152	-.152	54.722	-54.722
31	2	M19	1	.622	0	-1.012	.156	-.156	57.641	-57.641
32			2	.618	0	-1.008	.156	-.156	56.77	-56.77
33			3	.613	0	-1.005	.155	-.155	55.902	-55.902
34			4	.608	0	-1.001	.155	-.155	55.037	-55.037
35			5	.603	0	-.997	.155	-.155	54.176	-54.176
36	2	M24	1	.639	0	-1.335	.187	-.187	57.578	-57.578
37			2	.634	0	-1.33	.187	-.187	56.414	-56.414
38			3	.629	0	-1.325	.186	-.186	55.255	-55.255
39			4	.624	0	-1.319	.186	-.186	54.1	-54.1
40			5	.619	0	-1.314	.185	-.185	52.95	-52.95
41	2	M20	1	.615	0	-1.035	.158	-.158	57.174	-57.174
42			2	.61	0	-1.031	.158	-.158	56.265	-56.265
43			3	.605	0	-1.027	.158	-.158	55.359	-55.359

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.601	0	-1.023	.158	-.158	54.457	-54.457
45			5	.596	0	-1.019	.157	-.157	53.558	-53.558
46	2	M21	1	.608	0	-1.059	.161	-.161	56.636	-56.636
47			2	.603	0	-1.055	.161	-.161	55.686	-55.686
48			3	.598	0	-1.051	.16	-.16	54.739	-54.739
49			4	.593	0	-1.047	.16	-.16	53.795	-53.795
50			5	.589	0	-1.043	.16	-.16	52.856	-52.856
51	2	M25	1	.632	0	-1.373	.19	-.19	56.525	-56.525
52			2	.627	0	-1.367	.189	-.189	55.297	-55.297
53			3	.622	0	-1.362	.189	-.189	54.075	-54.075
54			4	.617	0	-1.356	.188	-.188	52.857	-52.857
55			5	.612	0	-1.351	.188	-.188	51.645	-51.645
56	2	M29	1	.695	-.001	-2.24	.238	-.238	56.477	-56.477
57			2	.69	-.001	-2.23	.238	-.238	54.797	-54.797
58			3	.685	-.001	-2.221	.237	-.237	53.125	-53.125
59			4	.68	-.001	-2.211	.236	-.236	51.459	-51.459
60			5	.675	-.001	-2.201	.235	-.235	49.801	-49.801
61	2	M1	1	.64	0	-.748	.12	-.12	56.241	-56.241
62			2	.635	0	-.745	.12	-.12	55.649	-55.649
63			3	.631	0	-.742	.12	-.12	55.059	-55.059
64			4	.626	0	-.74	.12	-.12	54.472	-54.472
65			5	.621	0	-.737	.12	-.12	53.886	-53.886
66	2	M11	1	.632	0	-.76	.122	-.122	56.173	-56.173
67			2	.627	0	-.758	.122	-.122	55.561	-55.561
68			3	.623	0	-.755	.122	-.122	54.952	-54.952
69			4	.618	0	-.752	.122	-.122	54.345	-54.345
70			5	.613	0	-.75	.122	-.122	53.74	-53.74
71	2	M12	1	.624	0	-.774	.125	-.125	56.083	-56.083
72			2	.62	0	-.771	.125	-.125	55.451	-55.451
73			3	.615	0	-.768	.125	-.125	54.821	-54.821
74			4	.61	0	-.765	.124	-.124	54.193	-54.193
75			5	.606	0	-.763	.124	-.124	53.568	-53.568
76	2	M13	1	.617	0	-.787	.127	-.127	55.969	-55.969
77			2	.612	0	-.785	.127	-.127	55.315	-55.315
78			3	.607	0	-.782	.127	-.127	54.663	-54.663
79			4	.602	0	-.779	.127	-.127	54.013	-54.013
80			5	.598	0	-.776	.127	-.127	53.366	-53.366
81	2	M14	1	.609	0	-.801	.129	-.129	55.806	-55.806
82			2	.604	0	-.798	.129	-.129	55.128	-55.128
83			3	.599	0	-.795	.129	-.129	54.453	-54.453
84			4	.595	0	-.792	.129	-.129	53.78	-53.78
85			5	.59	0	-.789	.129	-.129	53.11	-53.11
86	2	M15	1	.601	0	-.817	.132	-.132	55.659	-55.659
87			2	.596	0	-.814	.132	-.132	54.956	-54.956
88			3	.592	0	-.811	.132	-.132	54.255	-54.255
89			4	.587	0	-.808	.131	-.131	53.557	-53.557
90			5	.582	0	-.805	.131	-.131	52.861	-52.861
91	2	M26	1	.625	0	-1.413	.193	-.193	55.309	-55.309
92			2	.62	0	-1.408	.192	-.192	54.011	-54.011
93			3	.615	0	-1.402	.192	-.192	52.718	-52.718
94			4	.61	0	-1.396	.191	-.191	51.431	-51.431
95			5	.605	0	-1.39	.191	-.191	50.149	-50.149

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	2	M30	1	.687	-.001	-2.323	.241	-.241	54.167	-54.167
97			2	.682	-.001	-2.312	.24	-.24	52.365	-52.365
98			3	.677	-.001	-2.302	.239	-.239	50.571	-50.571
99			4	.672	-.001	-2.292	.238	-.238	48.785	-48.785
100			5	.666	-.001	-2.281	.237	-.237	47.007	-47.007
101	2	M27	1	.618	-.001	-1.457	.196	-.196	53.899	-53.899
102			2	.613	-.001	-1.451	.195	-.195	52.522	-52.522
103			3	.608	-.001	-1.445	.195	-.195	51.151	-51.151
104			4	.603	-.001	-1.439	.194	-.194	49.785	-49.785
105			5	.582	-.001	-1.376	.185	-.185	48.405	-48.405
106	2	M31	1	.678	-.001	-2.413	.243	-.243	51.428	-51.428
107			2	.673	-.001	-2.402	.242	-.242	49.485	-49.485
108			3	.668	-.001	-2.391	.241	-.241	47.55	-47.55
109			4	.663	-.001	-2.38	.24	-.24	45.624	-45.624
110			5	.658	-.001	-2.37	.239	-.239	43.707	-43.707
111	2	M32	1	.67	-.001	-2.513	.245	-.245	48.143	-48.143
112			2	.665	-.001	-2.501	.244	-.244	46.034	-46.034
113			3	.66	-.001	-2.49	.244	-.244	43.936	-43.936
114			4	.655	-.001	-2.478	.243	-.243	41.847	-41.847
115			5	.65	-.001	-2.467	.242	-.242	39.767	-39.767
116	2	M33	1	.662	-.001	-2.622	.248	-.248	44.147	-44.147
117			2	.657	-.001	-2.61	.247	-.247	41.844	-41.844
118			3	.652	-.001	-2.597	.246	-.246	39.552	-39.552
119			4	.515	-.001	-2.109	.244	-.244	36.912	-36.912
120			5	.51	-.001	-2.097	.243	-.243	35.06	-35.06
121	2	M34	1	.561	-.001	-2.972	.277	-.277	41.537	-41.537
122			2	.555	-.001	-2.955	.276	-.276	39.354	-39.354
123			3	.55	-.001	-2.938	.275	-.275	37.183	-37.183
124			4	.545	-.001	-2.921	.274	-.274	35.025	-35.025
125			5	.54	-.001	-2.904	.273	-.273	32.88	-32.88
126	2	M35	1	.548	-.001	-3.107	.279	-.279	37.226	-37.226
127			2	.543	-.001	-3.088	.278	-.278	34.809	-34.809
128			3	.538	-.001	-3.07	.277	-.277	32.406	-32.406
129			4	.533	-.001	-3.052	.276	-.276	30.017	-30.017
130			5	.527	-.001	-3.034	.275	-.275	27.643	-27.643
131	2	M36	1	.536	-.001	-3.258	.282	-.282	31.716	-31.716
132			2	.372	0	-2.44	.28	-.28	28.716	-28.716
133			3	.367	0	-2.421	.279	-.279	26.69	-26.69
134			4	.362	0	-2.401	.278	-.278	24.68	-24.68
135			5	.357	0	-2.382	.277	-.277	22.687	-22.687
136	2	M37	1	.362	0	-2.566	.284	-.284	26.458	-26.458
137			2	.357	0	-2.545	.283	-.283	24.157	-24.157
138			3	.352	0	-2.524	.282	-.282	21.874	-21.874
139			4	.239	-.039	-3.527	.259	-.259	19.058	-19.058
140			5	.233	-.039	-3.506	.22	-.22	15.891	-15.891
141	2	M38	1	.237	-.039	-3.804	.225	-.225	18.911	-18.911
142			2	.232	-.039	-3.781	.185	-.185	15.171	-15.171
143			3	.227	-.039	-3.758	.145	-.145	11.455	-11.455
144			4	.068	-.039	-2.791	.104	-.104	7.723	-7.723
145			5	.063	-.039	-2.768	.064	-.064	4.982	-4.982
146	2	M39	1	.064	-.039	-3.022	.066	-.066	6.082	-6.082
147			2	.059	-.039	-2.997	.025	-.025	2.774	-2.774

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.053	0	-.433	0	0	.61	-.61
149			4	.048	0	-.408	0	0	.148	-.148
150			5	0	0	-.002	0	0	0	0
151	2	M6	1	.328	-.274	.004	0	0	0	0
152			2	.328	-.28	.004	-.776	.776	.011	-.011
153			3	.329	-.287	.004	-1.569	1.569	.022	-.022
154			4	.33	-.293	.004	-2.379	2.379	.033	-.033
155			5	.33	-.299	.004	-3.206	3.206	.044	-.044
156	2	M44	1	.216	-.189	.003	-1.336	1.336	.019	-.019
157			2	.216	-.195	.003	-1.688	1.688	.024	-.024
158			3	.217	-.201	.003	-2.051	2.051	.029	-.029
159			4	.217	-.207	.003	-2.426	2.426	.034	-.034
160			5	.218	-.213	.003	-2.811	2.811	.038	-.038
161	2	M4	1	.28	-.253	.002	0	0	0	0
162			2	.28	-.261	.002	-.809	.809	.007	-.007
163			3	.281	-.27	.002	-1.643	1.643	.014	-.014
164			4	.282	-.278	.002	-2.503	2.503	.02	-.02
165			5	.282	-.286	.002	-3.388	3.388	.027	-.027
166	2	M9	1	.187	-.072	.003	0	0	0	0
167			2	.188	-.076	.003	-.159	.159	.006	-.006
168			3	.188	-.08	.003	-.326	.326	.012	-.012
169			4	.188	-.084	.003	-.502	.502	.018	-.018
170			5	.189	-.088	.003	-.687	.687	.024	-.024
171	2	M47	1	.131	-.058	.002	-.32	.32	.012	-.012
172			2	.131	-.062	.002	-.411	.411	.015	-.015
173			3	.131	-.066	.002	-.507	.507	.018	-.018
174			4	.132	-.07	.002	-.609	.609	.021	-.021
175			5	.132	-.074	.002	-.717	.717	.024	-.024
176	2	M42	1	.177	-.174	.002	-1.305	1.305	.011	-.011
177			2	.178	-.182	.002	-1.657	1.657	.014	-.014
178			3	.178	-.19	.002	-2.025	2.025	.016	-.016
179			4	.179	-.197	.002	-2.408	2.408	.019	-.019
180			5	.179	-.205	.002	-2.807	2.807	.022	-.022
181	2	M2	1	.327	-.293	.002	0	0	0	0
182			2	.328	-.299	.002	-.854	.854	.005	-.005
183			3	.328	-.306	.002	-1.726	1.726	.011	-.011
184			4	.329	-.312	.002	-2.617	2.617	.016	-.016
185			5	.329	-.319	.002	-3.526	3.526	.022	-.022
186	2	M40	1	.215	-.201	.002	-1.469	1.469	.01	-.01
187			2	.215	-.207	.002	-1.856	1.856	.012	-.012
188			3	.216	-.213	.002	-2.255	2.255	.014	-.014
189			4	.216	-.22	.002	-2.665	2.665	.017	-.017
190			5	.217	-.226	.002	-3.087	3.087	.019	-.019
191	2	M3	1	-.255	-.446	-.002	0	0	0	0
192			2	-.254	-.452	-.002	-1.294	1.294	-.004	.004
193			3	-.254	-.458	-.002	-2.605	2.605	-.008	.008
194			4	-.253	-.465	-.002	-3.936	3.936	-.012	.012
195			5	-.253	-.471	-.002	-5.284	5.284	-.016	.016
196	2	M5	1	-.224	-.372	-.002	0	0	0	0
197			2	-.224	-.38	-.002	-1.181	1.181	-.005	.005
198			3	-.223	-.388	-.002	-2.388	2.388	-.01	.01
199			4	-.223	-.396	-.002	-3.619	3.619	-.015	.015

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.222	-.404	-.002	-4.876	4.876	-.02	.02
201	2	M7	1	-.253	-.435	-.003	0	0	0	0
202			2	-.253	-.442	-.003	-1.226	1.226	-.008	.008
203			3	-.252	-.448	-.003	-2.47	2.47	-.016	.016
204			4	-.252	-.454	-.003	-3.73	3.73	-.024	.024
205			5	-.251	-.46	-.003	-5.008	5.008	-.032	.032
206	2	M8	1	-.083	-.078	-.001	0	0	0	0
207			2	-.082	-.082	-.001	-.171	.171	-.002	.002
208			3	-.082	-.086	-.001	-.35	.35	-.005	.005
209			4	-.082	-.09	-.001	-.538	.538	-.007	.007
210			5	-.081	-.094	-.001	-.734	.734	-.01	.01
211	2	M10	1	0	0	0	0	0	0	0
212			2	0	0	0	0	0	0	0
213			3	0	0	0	0	0	0	0
214			4	0	0	0	0	0	0	0
215			5	0	0	0	0	0	0	0
216	2	M46	1	-.056	-.063	0	-.342	.342	-.005	.005
217			2	-.056	-.067	0	-.439	.439	-.006	.006
218			3	-.056	-.07	0	-.542	.542	-.007	.007
219			4	-.055	-.074	0	-.65	.65	-.009	.009
220			5	-.055	-.078	0	-.764	.764	-.01	.01
221	2	M41	1	-.165	-.299	-.001	-2.201	2.201	-.007	.007
222			2	-.164	-.305	-.001	-2.774	2.774	-.008	.008
223			3	-.164	-.311	-.001	-3.358	3.358	-.01	.01
224			4	-.163	-.318	-.001	-3.954	3.954	-.012	.012
225			5	-.163	-.324	-.001	-4.562	4.562	-.014	.014
226	2	M43	1	-.139	-.248	-.001	-1.878	1.878	-.008	.008
227			2	-.139	-.256	-.001	-2.377	2.377	-.01	.01
228			3	-.138	-.263	-.001	-2.891	2.891	-.012	.012
229			4	-.137	-.271	-.001	-3.42	3.42	-.014	.014
230			5	-.137	-.279	-.001	-3.965	3.965	-.016	.016
231	2	M45	1	-.164	-.292	-.002	-2.086	2.086	-.014	.014
232			2	-.164	-.298	-.002	-2.629	2.629	-.017	.017
233			3	-.163	-.304	-.002	-3.183	3.183	-.021	.021
234			4	-.163	-.31	-.002	-3.747	3.747	-.024	.024
235			5	-.162	-.316	-.002	-4.323	4.323	-.028	.028

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTTOM-POLE	0	104.508	-11.069	-1347.382	-.546	-7.737
2	3	Totals:	0	104.508	-11.069			
3	3	COG (ft):	X: -.041	Y: 94.066	Z: .005			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	3	M1	1	1.314	-.744	0	22.721	-22.721	-.091	.091
2			2	1.305	-.737	0	22.484	-22.484	-.091	.091
3			3	1.296	-.731	0	22.249	-22.249	-.091	.091
4			4	1.288	-.724	0	22.016	-22.016	-.091	.091
5			5	1.279	-.718	0	21.785	-21.785	-.091	.091
6	3	M11	1	1.301	-.745	0	22.229	-22.229	-.095	.095
7			2	1.293	-.739	0	21.986	-21.986	-.095	.095
8			3	1.284	-.732	0	21.746	-21.746	-.095	.095
9			4	1.275	-.726	0	21.508	-21.508	-.095	.095
10			5	1.266	-.72	0	21.272	-21.272	-.095	.095
11	3	M12	1	1.289	-.745	0	21.714	-21.714	-.099	.099
12			2	1.28	-.738	0	21.467	-21.467	-.099	.099
13			3	1.272	-.732	0	21.221	-21.221	-.099	.099
14			4	1.263	-.726	0	20.978	-20.978	-.099	.099
15			5	1.254	-.72	0	20.737	-20.737	-.099	.099
16	3	M16	1	1.348	-.735	0	21.425	-21.425	-.125	.125
17			2	1.339	-.729	0	21.133	-21.133	-.125	.125
18			3	1.33	-.724	0	20.843	-20.843	-.124	.124
19			4	1.321	-.718	0	20.556	-20.556	-.124	.124
20			5	1.312	-.713	0	20.271	-20.271	-.124	.124
21	3	M13	1	1.277	-.743	0	21.177	-21.177	-.103	.103
22			2	1.268	-.737	0	20.925	-20.925	-.103	.103
23			3	1.259	-.731	0	20.675	-20.675	-.103	.103
24			4	1.251	-.725	0	20.427	-20.427	-.103	.103
25			5	1.242	-.719	0	20.182	-20.182	-.103	.103
26	3	M17	1	1.336	-.731	0	20.723	-20.723	-.13	.13
27			2	1.327	-.725	0	20.426	-20.426	-.13	.13
28			3	1.318	-.72	0	20.132	-20.132	-.13	.13
29			4	1.309	-.714	0	19.84	-19.84	-.13	.13
30			5	1.3	-.709	0	19.55	-19.55	-.13	.13
31	3	M14	1	1.265	-.74	0	20.619	-20.619	-.108	.108
32			2	1.256	-.734	0	20.363	-20.363	-.108	.108
33			3	1.247	-.728	0	20.108	-20.108	-.108	.108
34			4	1.238	-.722	0	19.856	-19.856	-.107	.107
35			5	1.23	-.716	0	19.606	-19.606	-.107	.107
36	3	M15	1	1.253	-.735	0	20.041	-20.041	-.113	.113
37			2	1.244	-.73	0	19.78	-19.78	-.112	.112
38			3	1.235	-.724	0	19.521	-19.521	-.112	.112
39			4	1.226	-.718	0	19.265	-19.265	-.112	.112
40			5	1.217	-.712	0	19.011	-19.011	-.112	.112
41	3	M18	1	1.324	-.725	0	19.995	-19.995	-.137	.137
42			2	1.315	-.719	0	19.694	-19.694	-.137	.137
43			3	1.306	-.714	0	19.396	-19.396	-.136	.136

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.297	-.709	0	19.099	-19.099	-.136	.136
45			5	1.288	-.703	0	18.805	-18.805	-.136	.136
46	3	M19	1	1.312	-.718	0	19.244	-19.244	-.143	.143
47			2	1.303	-.712	0	18.939	-18.939	-.143	.143
48			3	1.294	-.707	0	18.636	-18.636	-.143	.143
49			4	1.285	-.702	0	18.335	-18.335	-.143	.143
50			5	1.276	-.697	0	18.037	-18.037	-.143	.143
51	3	M22	1	1.39	-.695	0	18.666	-18.666	-.176	.176
52			2	1.381	-.69	0	18.316	-18.316	-.176	.176
53			3	1.371	-.685	0	17.969	-17.969	-.176	.176
54			4	1.362	-.68	0	17.624	-17.624	-.176	.176
55			5	1.352	-.676	0	17.281	-17.281	-.175	.175
56	3	M20	1	1.301	-.709	0	18.468	-18.468	-.151	.151
57			2	1.292	-.704	0	18.159	-18.159	-.15	.15
58			3	1.282	-.699	0	17.853	-17.853	-.15	.15
59			4	1.273	-.694	0	17.549	-17.549	-.15	.15
60			5	1.264	-.689	0	17.247	-17.247	-.15	.15
61	3	M23	1	1.378	-.685	0	17.702	-17.702	-.186	.186
62			2	1.369	-.681	0	17.349	-17.349	-.186	.186
63			3	1.359	-.676	0	16.998	-16.998	-.185	.185
64			4	1.349	-.671	0	16.649	-16.649	-.185	.185
65			5	1.34	-.667	0	16.303	-16.303	-.185	.185
66	3	M21	1	1.289	-.7	0	17.668	-17.668	-.158	.158
67			2	1.28	-.695	0	17.356	-17.356	-.158	.158
68			3	1.271	-.69	0	17.046	-17.046	-.158	.158
69			4	1.261	-.685	0	16.739	-16.739	-.158	.158
70			5	1.252	-.681	0	16.433	-16.433	-.157	.157
71	3	M24	1	1.366	-.675	0	16.71	-16.71	-.196	.196
72			2	1.357	-.67	0	16.354	-16.354	-.196	.196
73			3	1.347	-.666	0	15.999	-15.999	-.196	.196
74			4	1.337	-.661	0	15.647	-15.647	-.195	.195
75			5	1.328	-.657	0	15.298	-15.298	-.195	.195
76	3	M25	1	1.355	-.663	0	15.689	-15.689	-.208	.208
77			2	1.345	-.659	0	15.33	-15.33	-.207	.207
78			3	1.335	-.655	0	14.973	-14.973	-.207	.207
79			4	1.326	-.65	0	14.618	-14.618	-.206	.206
80			5	1.316	-.646	0	14.265	-14.265	-.206	.206
81	3	M28	1	1.52	-.589	.001	15.445	-15.445	-.216	.216
82			2	1.51	-.585	.001	15.02	-15.02	-.215	.215
83			3	1.499	-.581	.001	14.599	-14.599	-.215	.215
84			4	1.489	-.577	.001	14.18	-14.18	-.214	.214
85			5	1.479	-.574	.001	13.764	-13.764	-.213	.213
86	3	M26	1	1.343	-.651	0	14.64	-14.64	-.22	.22
87			2	1.333	-.647	0	14.278	-14.278	-.22	.22
88			3	1.323	-.643	0	13.918	-13.918	-.219	.219
89			4	1.314	-.638	0	13.561	-13.561	-.219	.219
90			5	1.304	-.634	0	13.206	-13.206	-.218	.218
91	3	M29	1	1.505	-.577	.001	14.088	-14.088	-.23	.23
92			2	1.494	-.573	.001	13.662	-13.662	-.229	.229
93			3	1.484	-.57	.001	13.239	-13.239	-.228	.228
94			4	1.474	-.566	.001	12.82	-12.82	-.227	.227
95			5	1.463	-.562	.001	12.402	-12.402	-.226	.226

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	3	M27	1	1.331	-.638	0	13.562	-13.562	-.234	.234
97			2	1.322	-.633	0	13.198	-13.198	-.234	.234
98			3	1.312	-.629	0	12.836	-12.836	-.233	.233
99			4	1.302	-.626	0	12.476	-12.476	-.232	.232
100			5	1.258	-.58	0	12.107	-12.107	-.179	.179
101	3	M30	1	1.489	-.564	.002	12.7	-12.7	-.246	.246
102			2	1.479	-.561	.002	12.274	-12.274	-.245	.245
103			3	1.468	-.557	.002	11.851	-11.851	-.243	.243
104			4	1.458	-.553	.002	11.431	-11.431	-.242	.242
105			5	1.448	-.55	.002	11.013	-11.013	-.241	.241
106	3	M31	1	1.474	-.55	.002	11.284	-11.284	-.264	.264
107			2	1.463	-.547	.002	10.859	-10.859	-.262	.262
108			3	1.453	-.544	.002	10.435	-10.435	-.261	.261
109			4	1.442	-.54	.002	10.015	-10.015	-.259	.259
110			5	1.432	-.537	.002	9.597	-9.597	-.258	.258
111	3	M32	1	1.458	-.536	.002	9.839	-9.839	-.284	.284
112			2	1.448	-.533	.002	9.414	-9.414	-.282	.282
113			3	1.437	-.529	.002	8.992	-8.992	-.281	.281
114			4	1.427	-.526	.002	8.572	-8.572	-.279	.279
115			5	1.416	-.523	.002	8.154	-8.154	-.277	.277
116	3	M33	1	1.443	-.521	.002	8.366	-8.366	-.308	.308
117			2	1.432	-.518	.002	7.942	-7.942	-.306	.306
118			3	1.422	-.515	.002	7.52	-7.52	-.304	.304
119			4	1.123	-.437	.002	7.101	-7.101	-.301	.301
120			5	1.112	-.434	.002	6.745	-6.745	-.3	.3
121	3	M34	1	1.222	-.435	.003	7.688	-7.688	-.355	.355
122			2	1.211	-.432	.003	7.287	-7.287	-.353	.353
123			3	1.2	-.429	.003	6.889	-6.889	-.351	.351
124			4	1.19	-.426	.003	6.494	-6.494	-.349	.349
125			5	1.179	-.423	.003	6.102	-6.102	-.347	.347
126	3	M35	1	1.197	-.418	.003	6.241	-6.241	-.393	.393
127			2	1.186	-.415	.003	5.846	-5.846	-.39	.39
128			3	1.175	-.413	.003	5.455	-5.455	-.387	.387
129			4	1.164	-.41	.003	5.066	-5.066	-.385	.385
130			5	1.153	-.407	.003	4.68	-4.68	-.382	.382
131	3	M36	1	1.172	-.404	.004	4.788	-4.788	-.438	.438
132			2	.817	-.314	.003	4.441	-4.441	-.435	.435
133			3	.806	-.311	.003	4.139	-4.139	-.433	.433
134			4	.795	-.308	.003	3.839	-3.839	-.43	.43
135			5	.784	-.306	.003	3.542	-3.542	-.428	.428
136	3	M37	1	.797	-.301	.003	3.626	-3.626	-.499	.499
137			2	.786	-.298	.003	3.329	-3.329	-.496	.496
138			3	.775	-.296	.003	3.035	-3.035	-.493	.493
139			4	.547	-.448	.002	2.651	-2.651	-.491	.491
140			5	.536	-.446	.002	2.208	-2.208	-.489	.489
141	3	M38	1	.544	-.442	.003	2.262	-2.262	-.582	.582
142			2	.533	-.44	.003	1.814	-1.814	-.579	.579
143			3	.522	-.438	.003	1.369	-1.369	-.577	.577
144			4	.175	-.356	0	.992	-.992	-.574	.574
145			5	.164	-.354	0	.631	-.631	-.573	.573
146	3	M39	1	.166	-.35	0	.647	-.647	-.699	.699
147			2	.155	-.348	0	.284	-.284	-.698	.698

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.143	-.037	0	.051	-.051	-.697	.697
149			4	.132	-.035	0	.013	-.013	-.696	.696
150			5	0	0	0	0	0	0	0
151	3	M2	1	.082	-.993	.002	0	0	0	0
152			2	.083	-1.004	.005	-2.878	2.878	.008	-.008
153			3	.083	-1.015	.008	-5.788	5.788	.024	-.024
154			4	.084	-1.027	.012	-8.732	8.732	.049	-.049
155			5	.085	-1.039	.016	-11.709	11.709	.085	-.085
156	3	M3	1	.082	-.993	-.002	0	0	0	0
157			2	.083	-1.004	-.005	-2.878	2.878	-.008	.008
158			3	.083	-1.015	-.008	-5.788	5.788	-.024	.024
159			4	.084	-1.027	-.012	-8.731	8.731	-.049	.049
160			5	.085	-1.039	-.016	-11.707	11.707	-.084	.084
161	3	M4	1	.063	-.859	.001	0	0	0	0
162			2	.064	-.873	.005	-2.722	2.722	.008	-.008
163			3	.065	-.887	.008	-5.487	5.487	.025	-.025
164			4	.066	-.902	.013	-8.298	8.298	.054	-.054
165			5	.067	-.917	.018	-11.155	11.155	.096	-.096
166	3	M5	1	.063	-.859	-.001	0	0	0	0
167			2	.064	-.873	-.004	-2.721	2.721	-.008	.008
168			3	.065	-.887	-.008	-5.486	5.486	-.025	.025
169			4	.066	-.902	-.013	-8.297	8.297	-.054	.054
170			5	.067	-.917	-.018	-11.153	11.153	-.096	.096
171	3	M6	1	.084	-.992	.002	0	0	0	0
172			2	.085	-1.003	.005	-2.79	2.79	.009	-.009
173			3	.086	-1.014	.008	-5.611	5.611	.024	-.024
174			4	.087	-1.025	.012	-8.463	8.463	.048	-.048
175			5	.088	-1.037	.016	-11.346	11.346	.083	-.083
176	3	M7	1	.084	-.992	-.002	0	0	0	0
177			2	.085	-1.003	-.005	-2.789	2.789	-.009	.009
178			3	.086	-1.014	-.008	-5.609	5.609	-.024	.024
179			4	.087	-1.025	-.012	-8.46	8.46	-.048	.048
180			5	.088	-1.037	-.016	-11.343	11.343	-.082	.082
181	3	M8	1	.024	-.298	0	0	0	0	0
182			2	.024	-.305	-.002	-.645	.645	-.003	.003
183			3	.025	-.312	-.005	-1.306	1.306	-.01	.01
184			4	.026	-.319	-.007	-1.982	1.982	-.021	.021
185			5	.026	-.327	-.01	-2.674	2.674	-.037	.037
186	3	M9	1	.039	-.489	0	0	0	0	0
187			2	.04	-.496	.003	-1.055	1.055	.004	-.004
188			3	.04	-.503	.005	-2.125	2.125	.011	-.011
189			4	.041	-.511	.008	-3.211	3.211	.023	-.023
190			5	.042	-.518	.01	-4.312	4.312	.04	-.04
191	3	M10	1	0	0	0	0	0	0	0
192			2	0	0	0	0	0	0	0
193			3	0	0	0	0	0	0	0
194			4	0	0	0	0	0	0	0
195			5	0	0	0	0	0	0	0
196	3	M46	1	.018	-.218	-.007	-1.247	1.247	-.018	.018
197			2	.019	-.225	-.01	-1.579	1.579	-.029	.029
198			3	.019	-.232	-.012	-1.921	1.921	-.043	.043
199			4	.02	-.239	-.015	-2.273	2.273	-.06	.06

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.02	-.246	-.018	-2.636	2.636	-.08	.08
201	3	M47	1	.029	-.345	.008	-2.011	2.011	.02	-.02
202			2	.029	-.352	.01	-2.534	2.534	.031	-.031
203			3	.03	-.359	.013	-3.067	3.067	.045	-.045
204			4	.03	-.366	.015	-3.61	3.61	.062	-.062
205			5	.031	-.373	.018	-4.164	4.164	.083	-.083
206	3	M43	1	.042	-.56	-.012	-4.296	4.296	-.039	.039
207			2	.043	-.574	-.016	-5.419	5.419	-.062	.062
208			3	.044	-.588	-.021	-6.569	6.569	-.092	.092
209			4	.045	-.602	-.026	-7.748	7.748	-.131	.131
210			5	.046	-.617	-.032	-8.954	8.954	-.178	.178
211	3	M42	1	.042	-.56	.012	-4.297	4.297	.039	-.039
212			2	.043	-.574	.016	-5.42	5.42	.062	-.062
213			3	.044	-.588	.021	-6.57	6.57	.093	-.093
214			4	.045	-.602	.026	-7.749	7.749	.131	-.131
215			5	.046	-.617	.032	-8.956	8.956	.178	-.178
216	3	M45	1	.057	-.656	-.011	-4.725	4.725	-.036	.036
217			2	.058	-.667	-.015	-5.942	5.942	-.056	.056
218			3	.059	-.678	-.019	-7.178	7.178	-.082	.082
219			4	.06	-.688	-.023	-8.434	8.434	-.113	.113
220			5	.061	-.7	-.028	-9.711	9.711	-.152	.152
221	3	M44	1	.057	-.657	.011	-4.726	4.726	.036	-.036
222			2	.058	-.667	.015	-5.943	5.943	.056	-.056
223			3	.059	-.678	.019	-7.18	7.18	.082	-.082
224			4	.06	-.689	.023	-8.437	8.437	.114	-.114
225			5	.061	-.7	.028	-9.713	9.713	.152	-.152
226	3	M41	1	.056	-.658	-.012	-4.877	4.877	-.037	.037
227			2	.057	-.669	-.015	-6.134	6.134	-.058	.058
228			3	.058	-.68	-.019	-7.411	7.411	-.085	.085
229			4	.059	-.691	-.024	-8.71	8.71	-.118	.118
230			5	.06	-.702	-.028	-10.031	10.031	-.159	.159
231	3	M40	1	.056	-.658	.012	-4.877	4.877	.037	-.037
232			2	.057	-.669	.015	-6.134	6.134	.058	-.058
233			3	.058	-.68	.019	-7.412	7.412	.085	-.085
234			4	.059	-.691	.024	-8.712	8.712	.118	-.118
235			5	.06	-.702	.028	-10.032	10.032	.159	-.159

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTTOM-POLE	0	50.911	-35.597	-3541.86	-1.635	-2.997
2	4	Totals:	0	50.911	-35.597			
3	4	COG (ft):	X: -.038	Y: 90.961	Z: .001			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	4	M1	1	.64	-2.363	0	59.727	-59.727	-.035	.035
2			2	.635	-2.342	0	58.974	-58.974	-.035	.035
3			3	.631	-2.321	0	58.227	-58.227	-.035	.035
4			4	.626	-2.301	0	57.487	-57.487	-.035	.035
5			5	.621	-2.281	0	56.753	-56.753	-.035	.035
6	4	M11	1	.632	-2.315	0	57.909	-57.909	-.037	.037
7			2	.627	-2.295	0	57.156	-57.156	-.037	.037
8			3	.623	-2.274	0	56.41	-56.41	-.037	.037
9			4	.618	-2.254	0	55.67	-55.67	-.037	.037
10			5	.613	-2.235	0	54.937	-54.937	-.037	.037
11	4	M12	1	.624	-2.266	0	56.078	-56.078	-.038	.038
12			2	.62	-2.246	0	55.326	-55.326	-.038	.038
13			3	.615	-2.226	0	54.58	-54.58	-.038	.038
14			4	.61	-2.207	0	53.841	-53.841	-.038	.038
15			5	.606	-2.187	0	53.109	-53.109	-.038	.038
16	4	M13	1	.617	-2.215	0	54.236	-54.236	-.04	.04
17			2	.612	-2.196	0	53.485	-53.485	-.04	.04
18			3	.607	-2.177	0	52.74	-52.74	-.04	.04
19			4	.602	-2.158	0	52.002	-52.002	-.04	.04
20			5	.598	-2.139	0	51.27	-51.27	-.04	.04
21	4	M16	1	.645	-2.073	0	53.604	-53.604	-.049	.049
22			2	.64	-2.055	0	52.781	-52.781	-.048	.048
23			3	.635	-2.038	0	51.965	-51.965	-.048	.048
24			4	.63	-2.02	0	51.157	-51.157	-.048	.048
25			5	.626	-2.002	0	50.355	-50.355	-.048	.048
26	4	M14	1	.609	-2.164	0	52.382	-52.382	-.042	.042
27			2	.604	-2.146	0	51.632	-51.632	-.042	.042
28			3	.599	-2.127	0	50.889	-50.889	-.042	.042
29			4	.595	-2.108	0	50.152	-50.152	-.042	.042
30			5	.59	-2.09	0	49.421	-49.421	-.042	.042
31	4	M17	1	.637	-2.023	0	51.477	-51.477	-.051	.051
32			2	.632	-2.006	0	50.657	-50.657	-.051	.051
33			3	.628	-1.988	0	49.843	-49.843	-.051	.051
34			4	.623	-1.971	0	49.037	-49.037	-.051	.051
35			5	.618	-1.954	0	48.237	-48.237	-.051	.051
36	4	M15	1	.601	-2.112	0	50.517	-50.517	-.044	.044
37			2	.596	-2.094	0	49.769	-49.769	-.044	.044
38			3	.592	-2.076	0	49.027	-49.027	-.044	.044
39			4	.587	-2.058	0	48.292	-48.292	-.044	.044
40			5	.582	-2.04	0	47.563	-47.563	-.044	.044
41	4	M18	1	.63	-1.972	0	49.336	-49.336	-.053	.053
42			2	.625	-1.955	0	48.517	-48.517	-.053	.053
43			3	.62	-1.938	0	47.706	-47.706	-.053	.053

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.615	-1.922	0	46.902	-46.902	-.053	.053
45			5	.611	-1.905	0	46.105	-46.105	-.053	.053
46	4	M19	1	.622	-1.921	0	47.18	-47.18	-.056	.056
47			2	.618	-1.904	0	46.365	-46.365	-.056	.056
48			3	.613	-1.888	0	45.556	-45.556	-.056	.056
49			4	.608	-1.872	0	44.755	-44.755	-.056	.056
50			5	.603	-1.856	0	43.96	-43.96	-.056	.056
51	4	M20	1	.615	-1.869	0	45.01	-45.01	-.059	.059
52			2	.61	-1.853	0	44.197	-44.197	-.059	.059
53			3	.605	-1.837	0	43.392	-43.392	-.059	.059
54			4	.601	-1.822	0	42.593	-42.593	-.059	.059
55			5	.596	-1.806	0	41.801	-41.801	-.059	.059
56	4	M22	1	.653	-1.777	0	45.01	-45.01	-.07	.07
57			2	.649	-1.762	0	44.116	-44.116	-.07	.07
58			3	.644	-1.747	0	43.23	-43.23	-.07	.07
59			4	.639	-1.732	0	42.351	-42.351	-.07	.07
60			5	.634	-1.717	0	41.48	-41.48	-.069	.069
61	4	M21	1	.608	-1.817	0	42.823	-42.823	-.062	.062
62			2	.603	-1.802	0	42.014	-42.014	-.062	.062
63			3	.598	-1.786	0	41.211	-41.211	-.062	.062
64			4	.593	-1.771	0	40.416	-40.416	-.062	.062
65			5	.589	-1.756	0	39.627	-39.627	-.062	.062
66	4	M23	1	.646	-1.727	0	42.49	-42.49	-.074	.074
67			2	.641	-1.713	0	41.6	-41.6	-.074	.074
68			3	.636	-1.698	0	40.718	-40.718	-.074	.074
69			4	.632	-1.684	0	39.843	-39.843	-.074	.074
70			5	.627	-1.67	0	38.975	-38.975	-.073	.073
71	4	M24	1	.639	-1.678	0	39.949	-39.949	-.078	.078
72			2	.634	-1.663	0	39.063	-39.063	-.078	.078
73			3	.629	-1.65	0	38.184	-38.184	-.078	.078
74			4	.624	-1.636	0	37.313	-37.313	-.078	.078
75			5	.619	-1.622	0	36.45	-36.45	-.078	.078
76	4	M25	1	.632	-1.628	0	37.383	-37.383	-.083	.083
77			2	.627	-1.614	0	36.501	-36.501	-.083	.083
78			3	.622	-1.601	0	35.626	-35.626	-.083	.083
79			4	.617	-1.588	0	34.759	-34.759	-.083	.083
80			5	.612	-1.574	0	33.899	-33.899	-.083	.083
81	4	M28	1	.703	-1.382	0	36.65	-36.65	-.085	.085
82			2	.698	-1.37	0	35.656	-35.656	-.084	.084
83			3	.693	-1.358	0	34.67	-34.67	-.084	.084
84			4	.688	-1.346	0	33.693	-33.693	-.084	.084
85			5	.683	-1.334	0	32.725	-32.725	-.084	.084
86	4	M26	1	.625	-1.579	0	34.791	-34.791	-.089	.089
87			2	.62	-1.565	0	33.913	-33.913	-.089	.089
88			3	.615	-1.553	0	33.043	-33.043	-.088	.088
89			4	.61	-1.54	0	32.18	-32.18	-.088	.088
90			5	.605	-1.527	0	31.324	-31.324	-.088	.088
91	4	M29	1	.695	-1.337	0	33.494	-33.494	-.091	.091
92			2	.69	-1.325	0	32.509	-32.509	-.091	.091
93			3	.685	-1.314	0	31.533	-31.533	-.09	.09
94			4	.68	-1.302	0	30.565	-30.565	-.09	.09
95			5	.675	-1.291	0	29.606	-29.606	-.09	.09

Member Section Stresses (By Combination) (Continued)

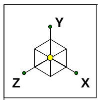
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	4	M27	1	.618	-1.529	0	32.169	-32.169	-.095	.095
97			2	.613	-1.517	0	31.296	-31.296	-.095	.095
98			3	.608	-1.504	0	30.43	-30.43	-.095	.095
99			4	.603	-1.492	0	29.571	-29.571	-.094	.094
100			5	.582	-1.364	0	28.731	-28.731	-.07	.07
101	4	M30	1	.687	-1.292	0	30.318	-30.318	-.098	.098
102			2	.682	-1.281	0	29.343	-29.343	-.098	.098
103			3	.677	-1.27	0	28.377	-28.377	-.098	.098
104			4	.672	-1.259	0	27.419	-27.419	-.097	.097
105			5	.666	-1.248	0	26.469	-26.469	-.097	.097
106	4	M31	1	.678	-1.248	0	27.122	-27.122	-.106	.106
107			2	.673	-1.237	0	26.157	-26.157	-.106	.106
108			3	.668	-1.227	0	25.201	-25.201	-.106	.106
109			4	.663	-1.216	0	24.253	-24.253	-.105	.105
110			5	.658	-1.206	0	23.312	-23.312	-.105	.105
111	4	M32	1	.67	-1.205	0	23.902	-23.902	-.116	.116
112			2	.665	-1.194	0	22.947	-22.947	-.116	.116
113			3	.66	-1.184	0	22.001	-22.001	-.115	.115
114			4	.655	-1.174	0	21.062	-21.062	-.115	.115
115			5	.65	-1.165	0	20.131	-20.131	-.115	.115
116	4	M33	1	.662	-1.162	0	20.653	-20.653	-.127	.127
117			2	.657	-1.152	0	19.708	-19.708	-.127	.127
118			3	.652	-1.143	0	18.771	-18.771	-.126	.126
119			4	.515	-1.02	0	17.836	-17.836	-.126	.126
120			5	.51	-1.01	0	17.007	-17.007	-.126	.126
121	4	M34	1	.561	-1.013	0	19.383	-19.383	-.149	.149
122			2	.555	-1.004	0	18.45	-18.45	-.149	.149
123			3	.55	-.995	0	17.525	-17.525	-.148	.148
124			4	.545	-.986	0	16.609	-16.609	-.148	.148
125			5	.54	-.977	0	15.701	-15.701	-.147	.147
126	4	M35	1	.548	-.972	0	16.058	-16.058	-.167	.167
127			2	.543	-.963	0	15.143	-15.143	-.166	.166
128			3	.538	-.955	0	14.235	-14.235	-.166	.166
129			4	.533	-.946	0	13.336	-13.336	-.165	.165
130			5	.527	-.938	0	12.445	-12.445	-.165	.165
131	4	M36	1	.536	-.935	0	12.734	-12.734	-.189	.189
132			2	.372	-.78	0	11.892	-11.892	-.189	.189
133			3	.367	-.772	0	11.14	-11.14	-.188	.188
134			4	.362	-.764	0	10.396	-10.396	-.188	.188
135			5	.357	-.756	0	9.66	-9.66	-.187	.187
136	4	M37	1	.362	-.751	0	9.89	-9.89	-.218	.218
137			2	.357	-.743	0	9.15	-9.15	-.218	.218
138			3	.352	-.736	0	8.417	-8.417	-.217	.217
139			4	.238	-1.205	0	7.409	-7.409	-.217	.217
140			5	.233	-1.197	0	6.219	-6.219	-.217	.217
141	4	M38	1	.237	-1.193	0	6.37	-6.37	-.258	.258
142			2	.232	-1.186	0	5.163	-5.163	-.257	.257
143			3	.226	-1.179	0	3.962	-3.962	-.257	.257
144			4	.068	-1.053	0	2.858	-2.858	-.256	.256
145			5	.063	-1.046	0	1.792	-1.792	-.256	.256
146	4	M39	1	.064	-1.043	0	1.837	-1.837	-.313	.313
147			2	.059	-1.036	0	.756	-.756	-.313	.313

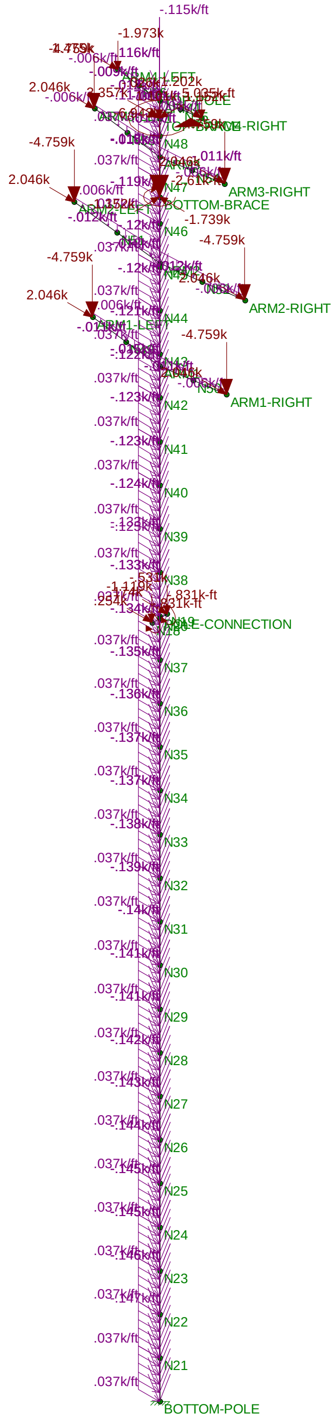
Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.053	-.061	0	.084	-.084	-.312	.312
149			4	.048	-.054	0	.024	-.024	-.312	.312
150			5	0	0	0	0	0	0	0
151	4	M2	1	.036	-.44	.002	0	0	0	0
152			2	.037	-.446	.009	-1.277	1.277	.014	-.014
153			3	.037	-.453	.018	-2.573	2.573	.047	-.047
154			4	.038	-.459	.028	-3.887	3.887	.104	-.104
155			5	.038	-.465	.041	-5.219	5.219	.19	-.19
156	4	M3	1	.036	-.44	-.002	0	0	0	0
157			2	.037	-.446	-.009	-1.277	1.277	-.014	.014
158			3	.037	-.453	-.018	-2.573	2.573	-.046	.046
159			4	.038	-.459	-.028	-3.886	3.886	-.103	.103
160			5	.038	-.465	-.041	-5.218	5.218	-.189	.189
161	4	M4	1	.028	-.381	.002	0	0	0	0
162			2	.028	-.389	.009	-1.209	1.209	.014	-.014
163			3	.029	-.397	.02	-2.443	2.443	.053	-.053
164			4	.029	-.405	.033	-3.703	3.703	.124	-.124
165			5	.03	-.413	.049	-4.987	4.987	.235	-.235
166	4	M5	1	.028	-.381	-.002	0	0	0	0
167			2	.028	-.389	-.009	-1.209	1.209	-.014	.014
168			3	.029	-.397	-.02	-2.443	2.443	-.053	.053
169			4	.029	-.405	-.033	-3.702	3.702	-.124	.124
170			5	.03	-.413	-.049	-4.987	4.987	-.234	.234
171	4	M6	1	.037	-.44	.002	0	0	0	0
172			2	.038	-.446	.009	-1.238	1.238	.014	-.014
173			3	.038	-.452	.017	-2.493	2.493	.045	-.045
174			4	.039	-.458	.028	-3.766	3.766	.1	-.1
175			5	.039	-.464	.04	-5.056	5.056	.182	-.182
176	4	M7	1	.037	-.44	-.002	0	0	0	0
177			2	.038	-.446	-.009	-1.238	1.238	-.014	.014
178			3	.038	-.452	-.017	-2.493	2.493	-.045	.045
179			4	.039	-.458	-.028	-3.766	3.766	-.1	.1
180			5	.039	-.464	-.04	-5.055	5.055	-.181	.181
181	4	M8	1	.007	-.082	0	0	0	0	0
182			2	.007	-.085	-.005	-.179	.179	-.005	.005
183			3	.007	-.089	-.011	-.366	.366	-.02	.02
184			4	.007	-.093	-.018	-.562	.562	-.047	.047
185			5	.008	-.097	-.025	-.766	.766	-.087	.087
186	4	M9	1	.013	-.167	0	0	0	0	0
187			2	.014	-.171	.006	-.362	.362	.006	-.006
188			3	.014	-.175	.011	-.733	.733	.022	-.022
189			4	.014	-.179	.018	-1.113	1.113	.049	-.049
190			5	.015	-.183	.026	-1.501	1.501	.09	-.09
191	4	M10	1	0	0	0	0	0	0	0
192			2	0	0	0	0	0	0	0
193			3	0	0	0	0	0	0	0
194			4	0	0	0	0	0	0	0
195			5	0	0	0	0	0	0	0
196	4	M46	1	.005	-.065	-.019	-.357	.357	-.043	.043
197			2	.006	-.069	-.026	-.458	.458	-.071	.071
198			3	.006	-.073	-.033	-.564	.564	-.107	.107
199			4	.006	-.076	-.041	-.675	.675	-.153	.153

Member Section Stresses (By Combination) (Continued)

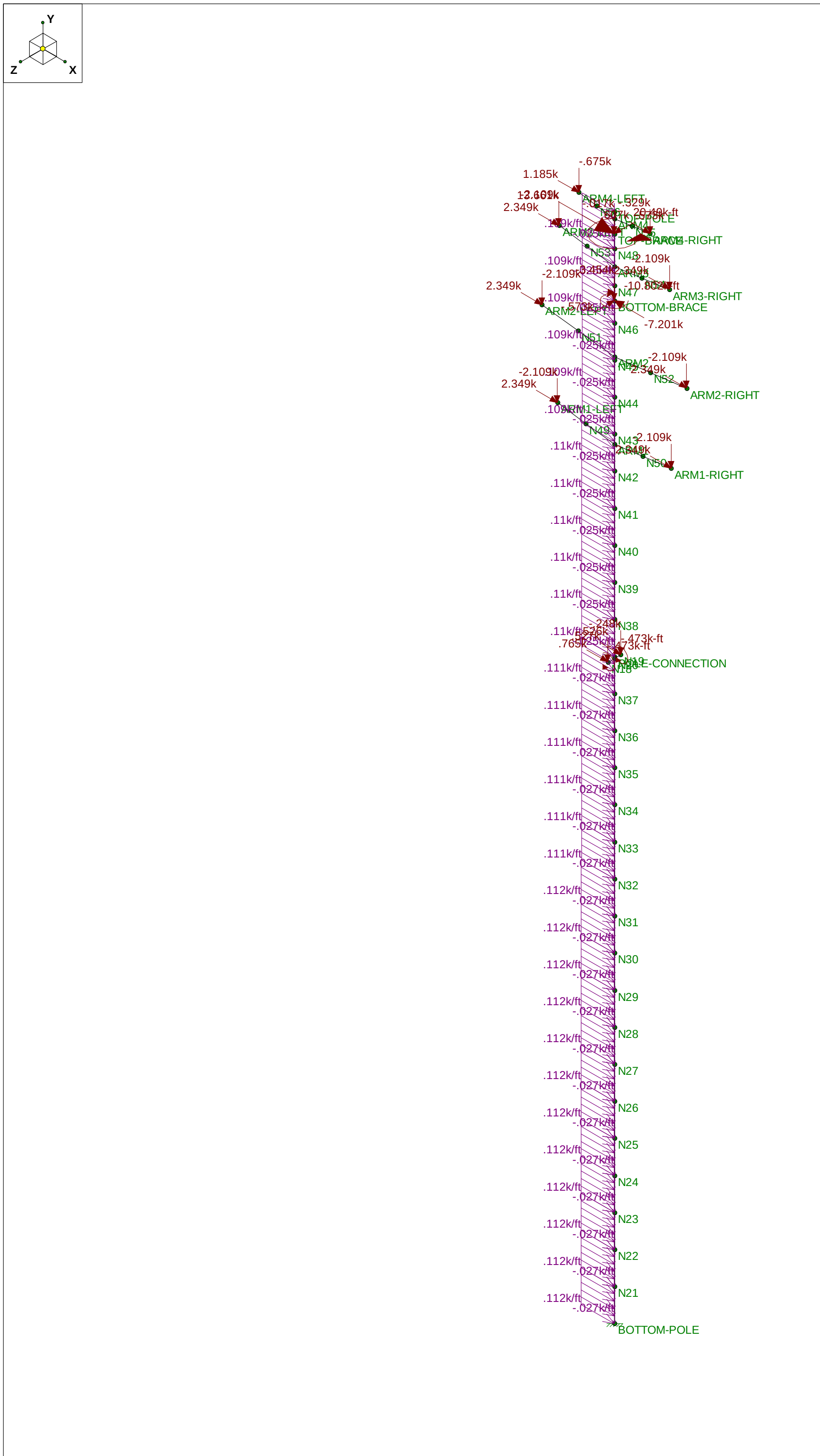
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.007	-.08	-.05	-.793	.793	-.21	.21
201	4	M47	1	.01	-.122	.019	-.7	.7	.045	-.045
202			2	.01	-.126	.026	-.886	.886	.073	-.073
203			3	.011	-.13	.033	-1.078	1.078	.11	-.11
204			4	.011	-.134	.041	-1.275	1.275	.156	-.156
205			5	.011	-.137	.05	-1.478	1.478	.213	-.213
206	4	M43	1	.019	-.252	-.033	-1.921	1.921	-.094	.094
207			2	.019	-.26	-.045	-2.428	2.428	-.157	.157
208			3	.02	-.268	-.059	-2.951	2.951	-.242	.242
209			4	.021	-.276	-.075	-3.49	3.49	-.352	.352
210			5	.021	-.284	-.093	-4.044	4.044	-.489	.489
211	4	M42	1	.019	-.252	.033	-1.921	1.921	.094	-.094
212			2	.019	-.26	.045	-2.429	2.429	.158	-.158
213			3	.02	-.268	.059	-2.952	2.952	.243	-.243
214			4	.021	-.276	.075	-3.49	3.49	.352	-.352
215			5	.021	-.284	.093	-4.044	4.044	.49	-.49
216	4	M45	1	.026	-.294	-.028	-2.106	2.106	-.079	.079
217			2	.026	-.3	-.038	-2.652	2.652	-.129	.129
218			3	.027	-.306	-.049	-3.209	3.209	-.195	.195
219			4	.027	-.312	-.061	-3.777	3.777	-.279	.279
220			5	.028	-.318	-.075	-4.357	4.357	-.382	.382
221	4	M44	1	.026	-.294	.028	-2.106	2.106	.08	-.08
222			2	.026	-.3	.038	-2.652	2.652	.129	-.129
223			3	.027	-.306	.049	-3.21	3.21	.195	-.195
224			4	.027	-.312	.061	-3.778	3.778	.279	-.279
225			5	.028	-.318	.075	-4.357	4.357	.383	-.383
226	4	M41	1	.025	-.295	-.029	-2.174	2.174	-.083	.083
227			2	.026	-.301	-.039	-2.738	2.738	-.135	.135
228			3	.026	-.307	-.05	-3.314	3.314	-.205	.205
229			4	.027	-.313	-.063	-3.902	3.902	-.293	.293
230			5	.027	-.319	-.077	-4.502	4.502	-.403	.403
231	4	M40	1	.025	-.295	.029	-2.174	2.174	.083	-.083
232			2	.026	-.301	.039	-2.738	2.738	.136	-.136
233			3	.026	-.307	.05	-3.314	3.314	.205	-.205
234			4	.027	-.313	.063	-3.902	3.902	.294	-.294
235			5	.027	-.319	.077	-4.502	4.502	.403	-.403





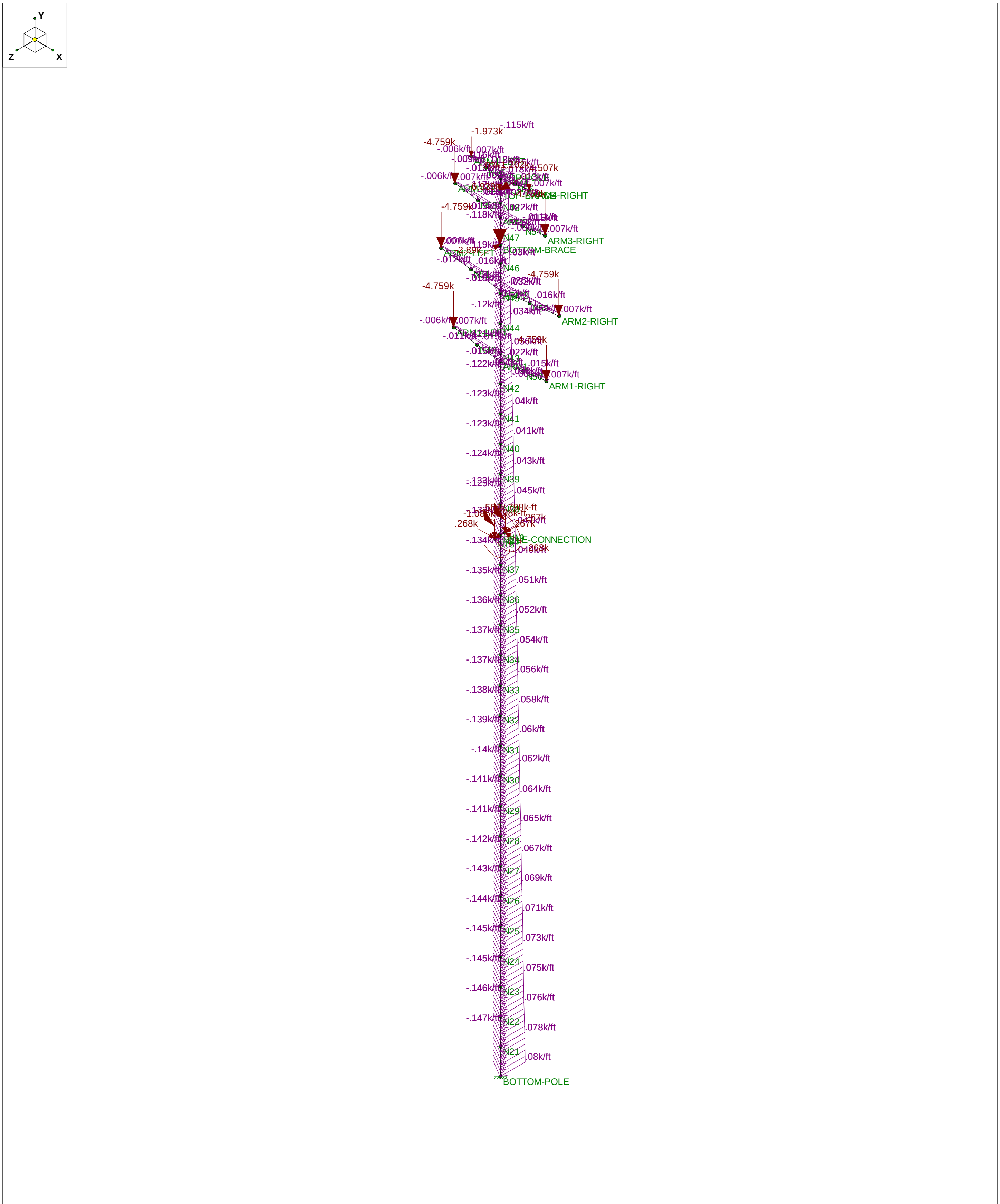
Loads: LC 1, x-direction NESC Heavy Wind

Centek		
TJL	Pole # 845	Mar 4, 2019 at 2:06 PM
18058.43 - CT11080B	LC #1 Loads	Utility Pole.r3d



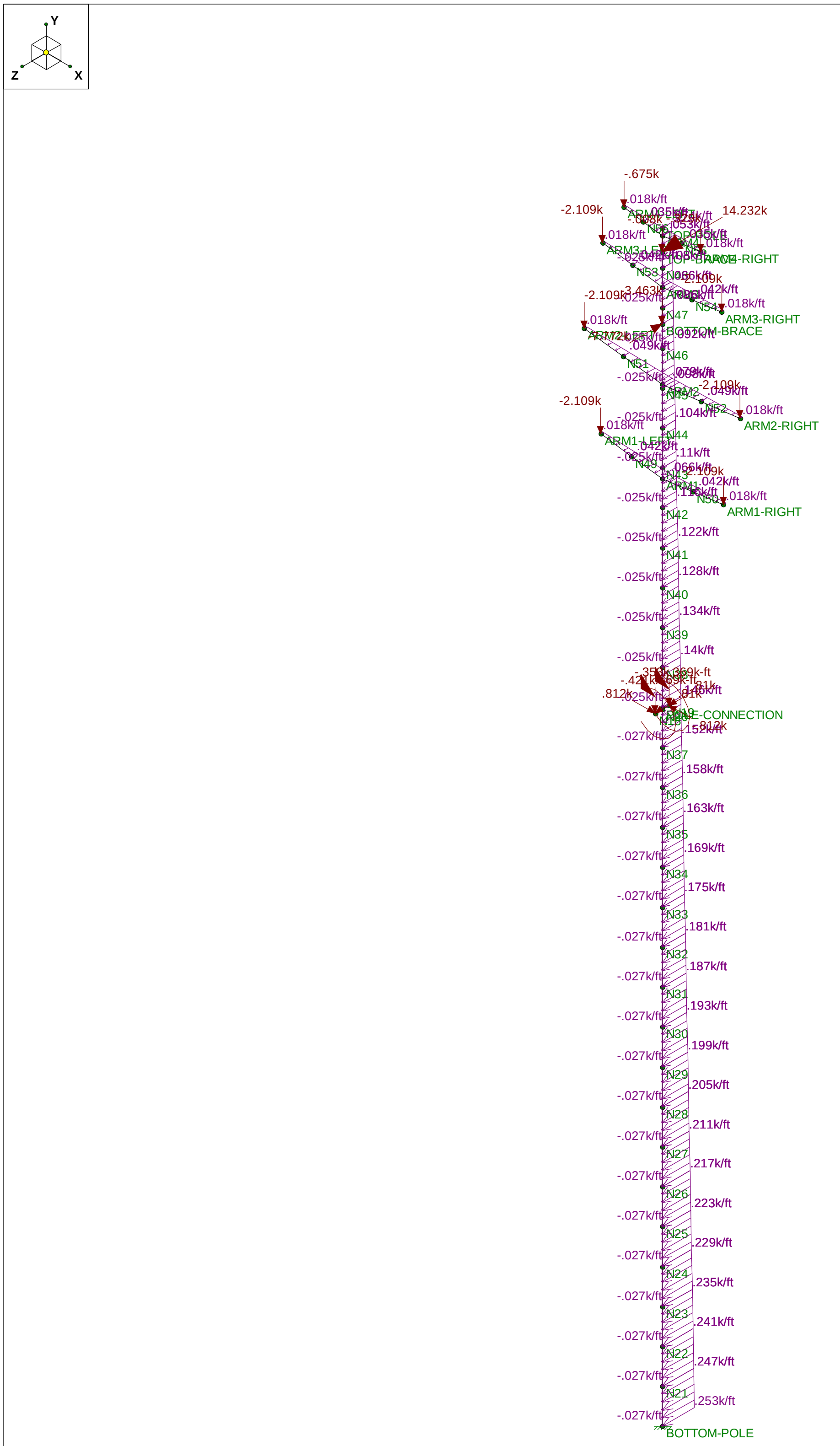
Loads: LC 2, x-direction NESC Extreme Wind

Centek		
TJL	Pole # 845	Mar 4, 2019 at 2:07 PM
18058.43 - CT11080B	LC #2 Loads	Utility Pole.r3d



Loads: LC 3, z-direction NESC Heavy Wind

Centek		
TJL	Pole # 845	Mar 4, 2019 at 2:07 PM
18058.43 - CT11080B	LC #3 Loads	Utility Pole.r3d



Loads: LC 4, z-direction NESC Extreme Wind

Centek		
TJL	Pole # 845	Mar 4, 2019 at 2:07 PM
18058.43 - CT11080B	LC #4 Loads	Utility Pole.r3d

Pole Analysis:

Pole Properties:

Wide Flange Moment of Inertia Iy =	$I_{yy} := 20.7 \cdot in^4$	(User Input)
Wide Flange Moment of Inertia Ix =	$I_{xx} := 843 \cdot in^4$	(User Input)
Wide Flange Area =	$A_{wf} := 13.0 \cdot in^2$	(User Input)
Flange Width =	$b_f := 6.5 \cdot in$	(User Input)
Wide Flange Depth =	$d_{wf} := 20.7 \cdot in$	(User Input)
Tower Width Top =	$W_{TTop} := 13 \cdot in$	(User Input)
Tower Width Base =	$W_{TBase} := 54 \cdot in$	(User Input)
Plate Thickness Top =	$Plt_{tTop} := 0.1875 \cdot in$	(User Input)
Plate Thickness Base =	$Plt_{tBase} := 0.5 \cdot in$	(User Input)
Length of Pole =	$L_{pole} := 150 \cdot ft$	(User Input)
Nominal Bending Stress =	$F_b := 60 \cdot ksi$	(User Input)
Modulus of Elasticity =	$E := 29000 \cdot ksi$	(User Input)

Member Forces:

Maximum Bending Stress x-direction = $f_{bxmax} := 59.3 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bxmax}}{F_b} = 98.8 \cdot \%$

$Bending\_Check\_x := if\left(f_{bxmax} < F_b, \text{"OK"}, \text{"NG"}\right)$

Bending_Check_x = "OK"

Maximum Bending Stress y-direction = $f_{bymax} := 59.7 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bymax}}{F_b} = 99.5 \cdot \%$

$Bending\_Check\_y := if\left(f_{bymax} < F_b, \text{"OK"}, \text{"NG"}\right)$

Bending_Check_y = "OK"

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 1474 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 28.3 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 31.8 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.0in$ (User Input)

$d_2 := 7.0in$ (User Input)

$d_3 := 12.0in$ (User Input)

$d_4 := 15.5in$ (User Input)

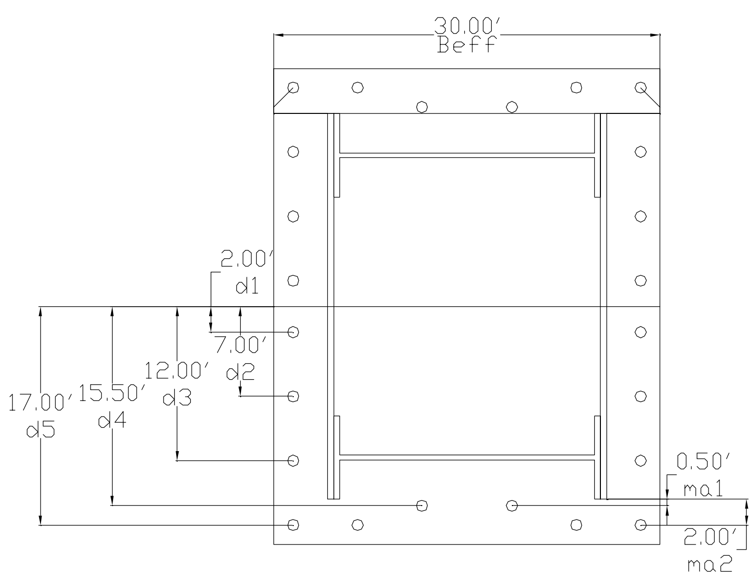
$d_5 := 17.0in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 0.5in$ (User Input)

$ma_2 := 2.0in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 30.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4 + (d_5)^2 \cdot 8\right] = 4061 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 72.7 \cdot kips$

Design Tensile Force = $T_S := F_y \cdot A_n = 75.7 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_S} \cdot 100 = 96$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_S} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts =

$$C_1 := \frac{OM \cdot d_4}{I_p} + \frac{Axial}{N} = 68.8 \cdot kips$$

$$C_2 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 75.4 \cdot kips$$

Applied Bending Stress in Plate =

$$f_{bp} := \frac{6 \cdot \left(2C_1 \cdot ma_1 + 4 \cdot C_2 \cdot ma_2\right)}{B_{eff} \cdot t_{bp}^{\ 2}} = 43.87 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} \cdot 100 = 81.2$$

Condition3 =

$$Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$$

Condition2 = "Ok"

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 941 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 20.5 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 28.3 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 3.5in$ (User Input)

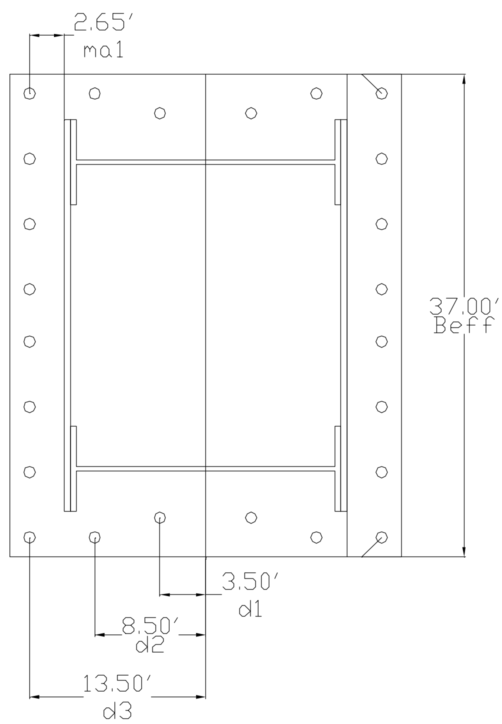
$d_2 := 8.5in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 37.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 16\right] = 3254 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 45.7 \cdot kips$

Design Tensile Force = $T_S := F_y \cdot A_n = 75.7 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_S} \cdot 100 = 60.3$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_S} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 48 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot \left(8C_1 \cdot ma_1\right)}{B_{eff} \, t_{bp}^{\;2}} = 53.91 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 99.8$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 4788 \cdot ft \cdot kips$	(Input From Risa3D)
Shear Force =	$Shear := 40.3 \cdot kips$	(Input From Risa3D)
Axial Force =	$Axial := 50.9 \cdot kips$	(Input From Risa3D)

Anchor Bolt Data:

Use ASTM A615 Grade 60

Number of Anchor Bolts =	$N := 26$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 3.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 7.5in$ (User Input)

$d_2 := 15.0in$ (User Input)

$d_3 := 22.5in$ (User Input)

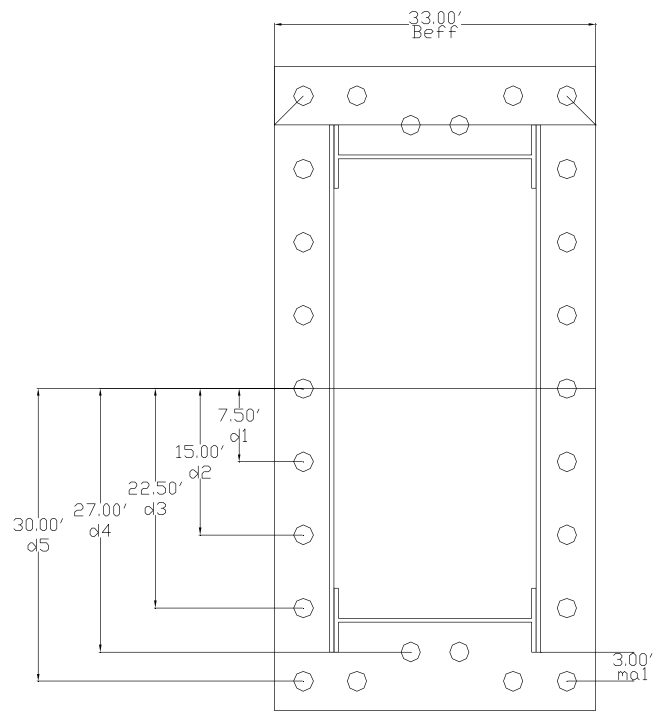
$d_4 := 27.0in$ (User Input)

$d_5 := 30in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 3.0in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 33.0in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4 + (d_5)^2 \cdot 8\right] = 1.327 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\;3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 128 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 65.7$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 131.9 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot \left(4C_1 \cdot ma_1\right)}{B_{eff} \cdot t_{bp}^{2}} = 31.97 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 76.1$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition2 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 3542 \cdot ft \cdot kips$	(Input From RISA-3D)
Shear Force =	$Shear := 35.6 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 50.9 \cdot kips$	(Input From Risa-3D)

Anchor Bolt Data:

Use ASTM A615 Grade 60

Number of Anchor Bolts =	$N := 26$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 3.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.5in$ (User Input)

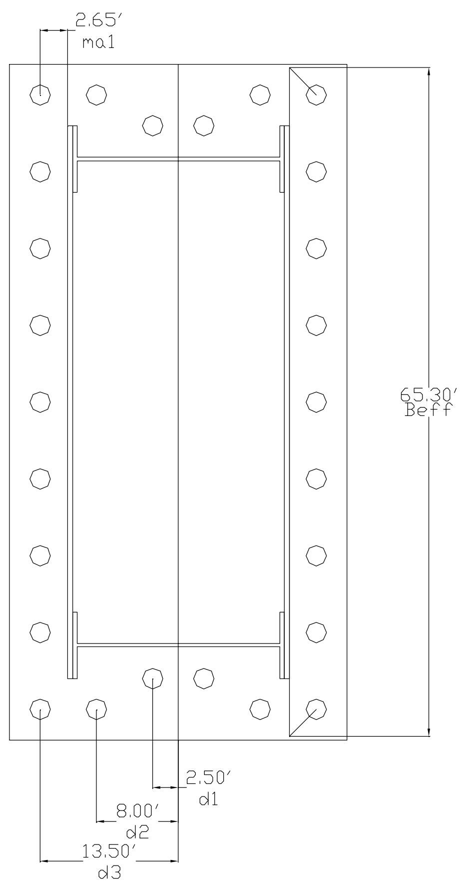
$d_2 := 8.0in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 65.3in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 18\right] = 3.562 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 159.2 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 81.7$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 163.071 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (9C_1 \cdot ma_1)}{B_{eff} \, t_{bp}^2} = 39.71 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 94.5$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

$Condition3 = \text{"Ok"}$

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 4788 \cdot ft \cdot kips \cdot 1.1 = 5267 \cdot ft \cdot kips$	(User Input)
Shear Force =	$Shear := 40.3 \cdot kip \cdot 1.1 = 44.33 \cdot kips$	(User Input)
Axial Force =	$Axial := 50.9 \cdot kip \cdot 1.1 = 55.99 \cdot kips$	(User Input)
Tower Height =	$H_t := 150 \cdot ft$	(User Input)

Footing Data:

Overall Depth of Footing =	$D_f := 16 \cdot ft$	(User Input)
Length of Pier =	$L_p := 14 \cdot ft$	(User Input)
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)
Width of Pier =	$W_{p1} := 7.5 \cdot ft$	(User Input)
Width of Pier =	$W_{p2} := 4 \cdot ft$	(User Input)
Thickness of Footing =	$T_f := 2.5 \cdot ft$	(User Input)
Width of Footing =	$W_{f1} := 22 \cdot ft$	(User Input)
Width of Footing =	$W_{f2} := 18 \cdot ft$	(User Input)

Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := 6000 \cdot psf$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 2 \cdot q_a = 12000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$		

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 120 \cdot \text{pcf}$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot \text{ksf}$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 4.86 \cdot \text{ksf}$

$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] = 4.86 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 5.76 \cdot \text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 5.31 \cdot \text{ksf}$

$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 2.5$

$A_p := W_{f2} \cdot T_p = 45$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 238.95 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := (W_{f1} \cdot W_{f2} \cdot T_f + W_{p1} \cdot W_{p2} \cdot L_p) \cdot \gamma_c = 211.5 \cdot \text{kip}$

Weight of Soil Above Footing = $WT_{s1} := [(W_{f1} \cdot W_{f2} - W_{p1} \cdot W_{p2}) \cdot (L_p - L_{pag} - n)] \cdot \gamma_s = 592.92 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left[\frac{(L_p - L_{pag})^2 \cdot \tan(\Phi_s)}{2} \cdot W_{f2}\right] \cdot \gamma_s = 113.64 \cdot \text{kip}$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(L_p - L_{pag})^3 \cdot \frac{\tan(\Phi_s)}{3}\right] \cdot \gamma_s = 113.64 \cdot \text{kips}$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + \text{Axial} = 860.41 \cdot \text{kip}$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_{f1}}{2} + S_u \cdot \frac{T_f}{3} + \left[(WT_{s2} + WT_{s3}) \cdot \left(W_{f1} + \frac{D_f \cdot \tan(\Phi_s)}{3}\right)\right] = 15364 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + \text{Shear} \cdot (L_p + T_f) = 5998 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.56$

Factor of Safety Required = $FS_{req} := 1$

OverTurning_Moment_Check := if(FS ≥ FS_{req}, "Okay" , "No Good")

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_{f1} \cdot W_{f2} = 396$

Section Modulus of Mat = $S := \dfrac{W_{f1}^{2} \cdot W_{f2}}{6} = 1452 \cdot ft^{3}$

Maximum Pressure in Mat = $P_{max} := \dfrac{WT_{tot}}{A_{mat}} + \dfrac{M_{ot}}{S} = 6.304 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

$Max\_Pressure\_Check = \text{"Okay"}$

Minimum Pressure in Mat = $P_{min} := \dfrac{WT_{tot}}{A_{mat}} - \dfrac{M_{ot}}{S} = -1.958 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), \text{"Okay"}, \text{"No Good"}\right]$

$Min\_Pressure\_Check = \text{"No Good"}$

Eccentricity = $e := \dfrac{M_{ot}}{WT_{tot}} = 6.971$

Adjusted Soil Pressure = $P_a := \dfrac{2 \cdot WT_{tot}}{3 \cdot W_{f2} \cdot \left(\dfrac{W_{f1}}{2} - e\right)} = 7.91 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 7.91 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

$Pressure\_Check = \text{"Okay"}$

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 3542 \cdot ft \cdot kips \cdot 1.1 = 3896 \cdot ft \cdot kips$	(User Input)
Shear Force =	$Shear := 35.6 \cdot kip \cdot 1.1 = 39.16 \cdot kips$	(User Input)
Axial Force =	$Axial := 50.9 \cdot kip \cdot 1.1 = 55.99 \cdot kips$	(User Input)
Tower Height =	$H_t := 150 \cdot ft$	(User Input)

Footing Data:

Overall Depth of Footing =	$D_f := 16 \cdot ft$	(User Input)
Length of Pier =	$L_p := 14 \cdot ft$	(User Input)
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)
Width of Pier =	$W_{p1} := 7.5 \cdot ft$	(User Input)
Width of Pier =	$W_{p2} := 4 \cdot ft$	(User Input)
Thickness of Footing =	$T_f := 2.5 \cdot ft$	(User Input)
Width of Footing =	$W_{f1} := 18 \cdot ft$	(User Input)
Width of Footing =	$W_{f2} := 22 \cdot ft$	(User Input)

Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := 6000 \cdot psf$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_s := 2 \cdot q_a = 12000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 120 \cdot \text{pcf}$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot \text{ksf}$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 4.86 \cdot \text{ksf}$

$P_{top} := \text{if}\left[n < (D_f - T_f), P_{pt}, P_{pn}\right] = 4.86 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 5.76 \cdot \text{ksf}$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 5.31 \cdot \text{ksf}$

$T_p := \text{if}\left[n < (D_f - T_f), T_f, (D_f - n)\right] = 2.5$

$A_p := W_{f2} \cdot T_p = 55$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 292.05 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := (W_{f1} \cdot W_{f2} \cdot T_f + W_{p1} \cdot W_{p2} \cdot L_p) \cdot \gamma_c = 211.5 \cdot \text{kip}$

Weight of Soil Above Footing = $WT_{s1} := \left[(W_{f1} \cdot W_{f2} - W_{p1} \cdot W_{p2}) \cdot (L_p - L_{pag} - n)\right] \cdot \gamma_s = 592.92 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left[\frac{(L_p - L_{pag})^2 \cdot \tan(\Phi_s)}{2} \cdot W_{f2}\right] \cdot \gamma_s = 138.893 \cdot \text{kip}$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(L_p - L_{pag})^3 \cdot \frac{\tan(\Phi_s)}{3}\right] \cdot \gamma_s = 113.64 \cdot \text{kips}$

Total Weight = $WT_{tot} := WT_c + WT_{s1} + \text{Axial} = 860.41 \cdot \text{kip}$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_{f1}}{2} + S_u \cdot \frac{T_f}{3} + \left[(WT_{s2} + WT_{s3}) \cdot \left(W_{f1} + \frac{D_f \cdot \tan(\Phi_s)}{3}\right)\right] = 13310 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := \text{OM} + \text{Shear} \cdot (L_p + T_f) = 4542 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.93$

Factor of Safety Required = $FS_{req} := 1$

OverTurning_Moment_Check := if$(FS \geq FS_{req}$, "Okay" , "No Good")

OverTurning_Moment_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_{f1} \cdot W_{f2} = 396$

Section Modulus of Mat = $S := \frac{W_{f1}^{2} \cdot W_{f2}}{6} = 1188 \cdot ft^{3}$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 5.996 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

$Max\_Pressure\_Check = \text{"Okay"}$

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -1.651 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < q_s\right), \text{"Okay"}, \text{"No Good"}\right]$

$Min\_Pressure\_Check = \text{"No Good"}$

Eccentricity = $e := \frac{M_{ot}}{WT_{tot}} = 5.279$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_{f2} \cdot \left(\frac{W_{f1}}{2} - e\right)} = 7.008 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 7.008 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < q_s, \text{"Okay"}, \text{"No Good"}\right)$

$Pressure\_Check = \text{"Okay"}$

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Section 1 - Site Information

Site ID: CT11080B
Status: Draft
Version: 2.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/1/2018 12:23:45 PM
Last Modified By: GSM1900\MSEDDIK

Site Name: CL&P at MP
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.2315990000
Longitude: -73.1900050000
Address: Rocky Hill Road (Pole 845)
City, State: Trumbull, CT
Region: NORTHEAST

RAN Template: 67D94B Outdoor	**AL Template:** 67D94B_1DP+1QP+1OP

Sector Count: 3	**Antenna Count:** 6	**Coax Line Count:** 24	**TMA Count:** 0	**RRU Count:** 3

Section 2 - Existing Template Images

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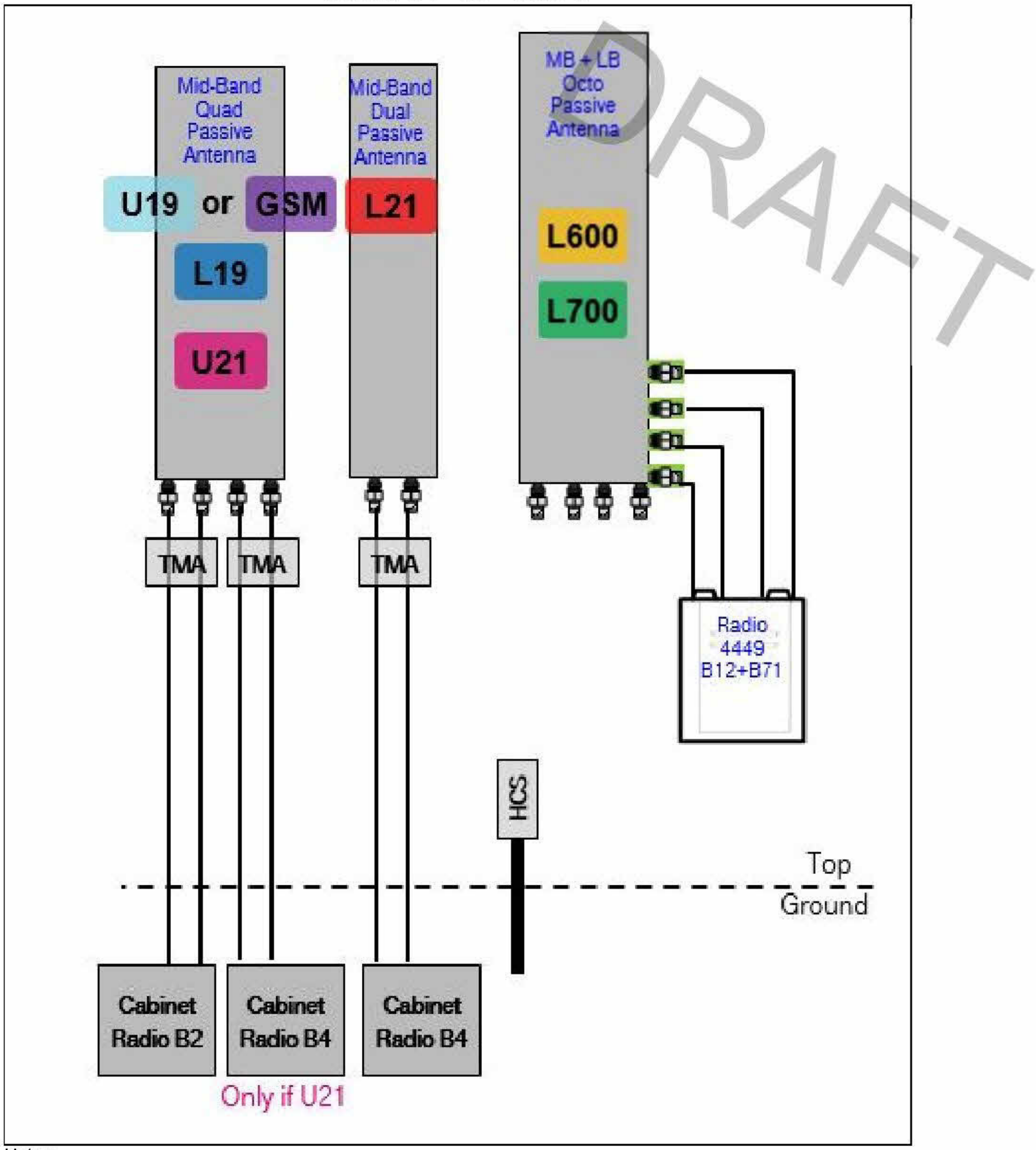
Section 3 - Proposed Template Images

67D94B_1DP+1QP+1OP.JPG



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 4B

Enclosure	1	2
Enclosure Type	RBS 6102	RBS 3106
Baseband	DUW30 DUL20 DUG20	
Radio	RUS01 B2 (x6) RUS01 B4 (x6)	

Proposed RAN Equipment

Template: 67D94B Outdoor

Enclosure	1	2
Enclosure Type	RBS 6102	Ancillary Equipment
Baseband	BB 5216 (L2100, L1900, L700, L600) DUW30 (U2100) DUG20 (G1900)	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG*
Multiplexer	XMU	
Radio	RUS01 B2 (x3) (L1900) RUS01 B2 (x3) (U1900, L1900) RUS01 B4 (x6) (L2100)	

RAN Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Section 6 - A&L Equipment

Existing Template: 4B
Proposed Template: 67D94B_1DP+1QP+1OP

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)	RFS - APXV18-206516S-C-A20 (Dual)
Azimuth	30	30
M. Tilt	0	0
Height	164	156
Ports	P1	P2
Active Tech.	G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.	U1900	
E. Tilt	3	3
Cables	1-1/4" Coax - 193 ft. (x2)	1-1/4" Coax - 193 ft. (x2)
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 67D94B Outdoor	A&L Template: 67D94B_1DP+1QP+1OP	Power System Template: Custom

CT11080B_L600_2.1_draft

Sector 1 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	30		30			
M. Tilt						
Height	164		154			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	U2100 L1900 G1900	L2100			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**			JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**
TMAs	RFS Twin Style 3CX - ATMA4P4DBP-1A20 (AtCabinet)	Ericsson Twin Style 1BX - KRY 112 144/2 (AtCabinet)				
Diplexers / Combiners	Ericsson Double AWS/PCS - KRF 102 267/2 (AtCabinet) **(x2)**					
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

swap and add total of 24 coax

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)	RFS - APXV18-206516S-C-A20 (Dual)
Azimuth	120	120
M. Tilt	0	0
Height	164	156
Ports	P1	P2
Active Tech.	G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.	U1900	
E. Tilt	7	7
Cables	1-1/4" Coax - 193 ft. (x2)	1-1/4" Coax - 193 ft. (x2)
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Sector 2 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	120		120			
M. Tilt						
Height	164		154			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	U2100 L1900 G1900	L2100			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**			JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**
TMAs	RFS Twin Style 3CX - ATMA4P4DBP-1A20 (AtCabinet)	Ericsson Twin Style 1BX - KRY 112 144/2 (AtCabinet)				
Diplexers / Combiners	Ericsson Double AWS/PCS - KRF 102 267/2 (AtCabinet) **(x2)**					
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

swap and add total of 24 coax

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	2
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)	RFS - APXV18-206516S-C-A20 (Dual)
Azimuth	300	300
M. Tilt	0	0
Height	164	156
Ports	P1	P2
Active Tech.	G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.	U1900	
E. Tilt	0	0
Cables	1-1/4" Coax - 193 ft. (x2)	1-1/4" Coax - 193 ft. (x2)
TMAs		
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Sector 3 (Proposed) view from behind						
Coverage Type	A - Outdoor Macro					
Antenna	1		2			
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)			
Azimuth	300		300			
M. Tilt						
Height	164		154			
Ports	P1	P2	P3	P4	P5	P6
Active Tech.	U2100 L1900 G1900	L2100			L700 L600	L700 L600
Dark Tech.						
Restricted Tech.						
Decomm. Tech.						
E. Tilt						
Cables	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**			JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**	JUMPER 6' DIN MALE-DIN MALE **(x2)** 1 1/4In AVA COAX CABLE 50 OHM - 193 ft. **(x2)**
TMAs	RFS Twin Style 3CX - ATMA4P4DBP-1A20 (AtCabinet)	Ericsson Twin Style 1BX - KRY 112 144/2 (AtCabinet)				
Diplexers / Combiners	Ericsson Double AWS/PCS - KRF 102 267/2 (AtCabinet) **(x2)**					
Radio					Radio 4449 B71+B12 (At Cabinet)	
Sector Equipment						

Unconnected Equipment:

Scope of Work:

swap and add total of 24 coax

RAN Template:	A&L Template:	Power System Template:
67D94B Outdoor	67D94B_1DP+1QP+1OP	Custom

CT11080B_L600_2.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

Proposed Power Systems Equipment

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.
- Low band arrays driven by a single RET motor

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

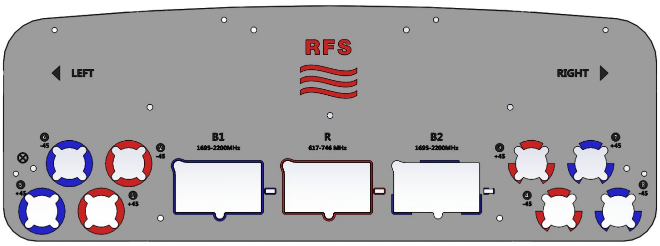
Impedance	Ohm	50.0
Polarization	Deg	±45°

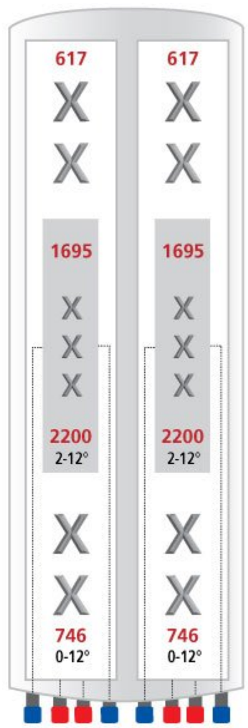
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

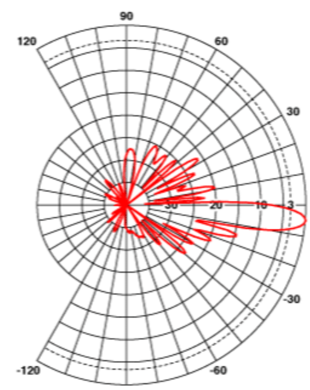
Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female



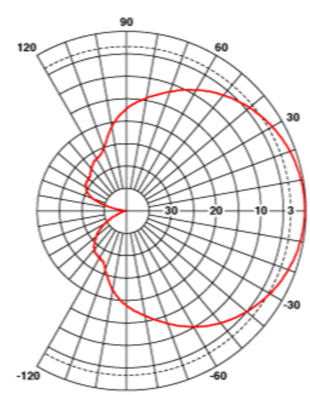
Vertical Pattern

Mechanical Specifications

Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Horizontal Pattern

DR. CLARENCE WELTI, P.E., P.C.
GEOTECHNICAL ENGINEERING
227 Williams Street • P.O. Box 397
Glastonbury, CT 06033
(860) 633-4623 / FAX (860) 657-2514

July 7, 2009

Mr. Jason Mead, Structural Engineer
Natcomm, Inc.
63-2 North Branford Road
Branford, CT 06405

Re: CL&P Tower - Pole #845, Rocky Hill Terrace, Trumbull, CT - Geotechnical Study to Evaluate the Existing Monopole Foundation for Supporting Additional Loads

Dear Mr. Mead:

1.0 Herewith is the data from the test boring taken at the above referenced site. One boring was drilled thru the existing tower foundation and to the depth of 24 feet. The boring was cored 5 feet into the bedrock. The boring was located about 4 feet from the existing foundation pier. *The boring was drilled by Clarence Welti Associates, Inc. and sampling was conducted by this firm solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.*

2.0 The **Subject Project** will include placing the additional loading on the existing CL&P transmission pole. The existing monopole and foundation will be analyzed for the increased loads. The top of the existing monopole is 150± feet above the ground surface elevation. Based on the CL&P foundation plan dated October 1, 1975, the existing foundation consist of a 18' x 22' x 2.5' thick footing supporting a 4' x 7.5' x 14' high pier. The pier extends about 6" above the existing grades, which places the bottom of foundation at 16± feet below the existing ground surface. The test boring, which was taken thru the tower foundation, confirmed the depth and thickness of the foundation.

3.0 The **Soils Cross Section** from the boring is generally as follows:

FILL; Fine to coarse SAND, some Gravel and Cobbles, little Silt to 13.5 feet, medium compact

Concrete Foundation from 13.5 to 16 feet

Fine to coarse SAND and GRAVEL, few Cobbles, little Silt to the top of bedrock at 19 feet, dense

Bedrock; Granitic Gneiss

3.1 The **Ground Water Table** was not evident above the bedrock at the completion of the boring. For design it should be assumed that the high water table could be at 16 feet below grade.

4.0 In general the criteria for tower support is that the foundation capacity would exceed the loads, which might collapse the tower. **Movements from strains in the soils should be limited to differential settlement (or lateral movements of less than ½").**

5.0 Based on the test boring the existing foundation is atop 3 feet of sand and gravel overlying the bedrock. Resistance to uplift and shear forces would be provided by the weight of the foundation and soil backfill. The allowable bearing pressure used to evaluate the existing foundation can be 3 Tons/sf.

5.1 The foundation design parameters used to evaluate the existing mat foundation can be as follows:

Design Parameter	Value
Allowable Bearing Pressure at Existing Foundation Subgrade	3 Tons/sf
Soil Unit Weight of Backfill (0 to 13.5 ft below grade)	125 pcf
Soil Unit Weight (16 to 19 ft below grade)	135 pcf
Internal Friction Angle (0 to 13.5ft below grade)	32°
Internal Friction Angle (16 to 19 feet)	36°
Ultimate Sliding Factor, concrete on soil	0.50
Frost Protection Depth	3.5 feet
Water Table (Design)	16 feet below grade

6.0 The soils at the subject site are generally in OSHA class C which would require excavations that exceed 5 feet high, to have the slopes cut back to 34° from the horizontal.

7.0 This report has been prepared for specific a application to the subject project in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made. In the event that any changes in the nature, design and location of structures are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

The analyses and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

Dr. Clarence Welti, P.E., P.C., should perform a general review of the final design and specifications in order that geotechnical design recommendations may be properly interpreted and implemented as they were intended.

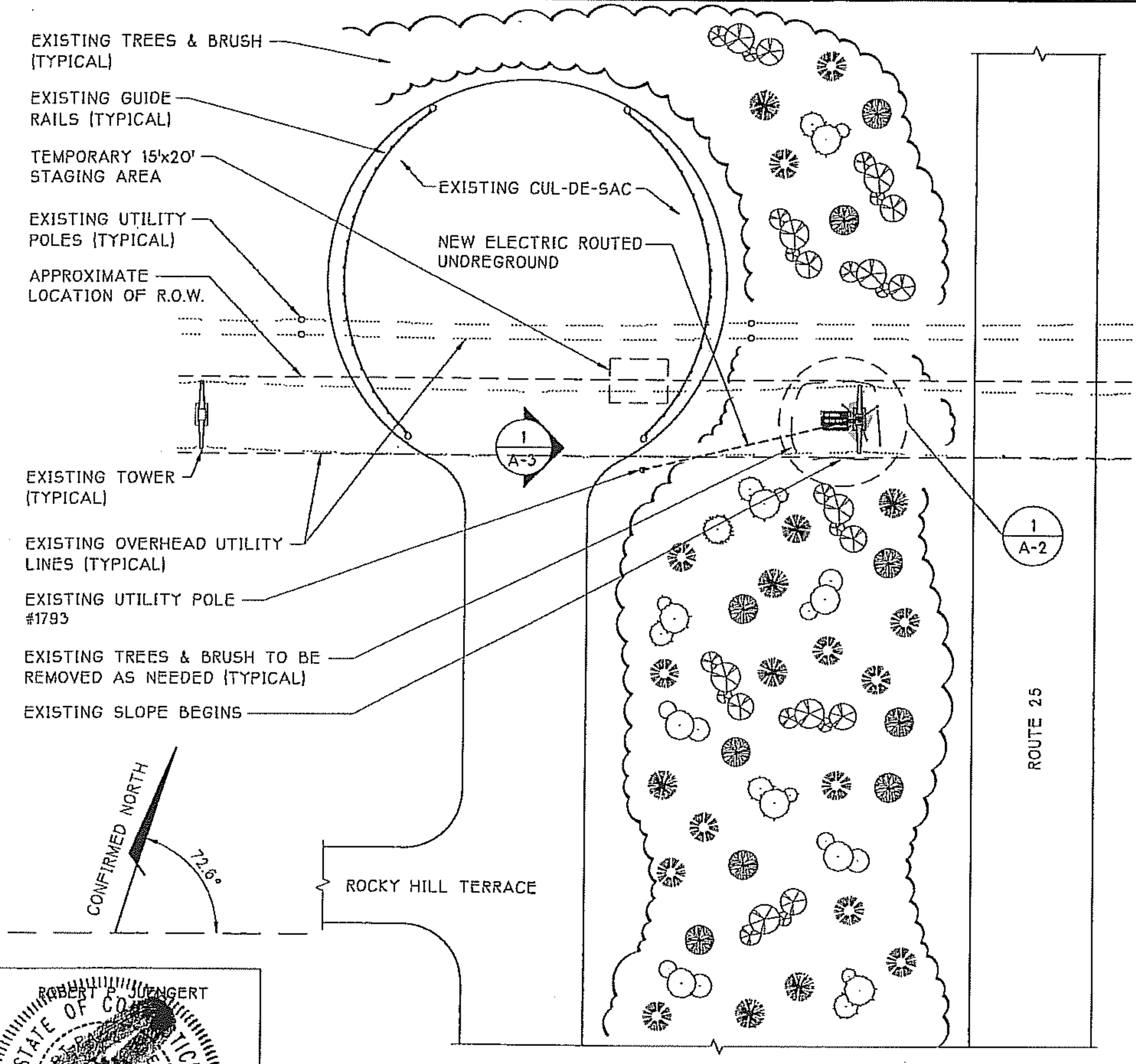
If you have any questions please call me.

Very truly yours,

Max Welti

Max Welti, P. E.

C: \NfmWork\7288\7288_A-1.dwg Thu Sep 03 34:55 1998 DCa



ROBERT P. JUENGERT
STATE OF CONNECTICUT
No. 4208
REGISTERED ARCHITECT
CT- 4208

1 / A-1 SITE LAYOUT
SCALE: 1" = 50'-0"

NOTE:
FOR ITEMS SUPPLIED BY OTHERS SEE GENERAL NOTES DRAWING A-14, A-15 & A-16

NOTE:
ALL NEW EQUIPMENT SHALL NOT OBSTRUCT ANY EXISTING EQUIPMENT OR CLIMBING APPARATUS.

ARCNET ARCHITECTS, INC.
670 North Beers Street, Building 2, Holmdel, NJ 07733
Tel: 732.739.3200 Fax: 732.739.0440

Drawing Title: SITE LAYOUT
Client: OCS

Project: CL&P TOWER - POLE #845
Address: ROCKY HILL TERRACE
TRUMBULL, C.T.
Approved By:
PROJ. MGR: ______ DATE: ______
R.F. ENGR: ______ DATE: ______
SAC: ______ DATE: ______
OWNER: ______ DATE: ______

Revision No.	Date
REV.1 DCo	7/1/98

Drawing No. A-1

Search Area	P.C.	P.C. Chkd	Chkd. by	ARCNET Project No.	Drawn	Date
CL&P-TRUMBULL/MPX49	GMc			A96.506.728B	DCo	5/21/98

Site ID No.: CT-11-080B

CLARENCE WELTI ASSOC., INC.
P.O. BOX 397
GLASTONBURY, CONN 06033

CLIENT: NATCOMM, INC.	PROJECT NAME: CL&P TOWER #845	LOCATION: ROCKY HILL TERRACE, TRUMBULL, CT

	AUGER	CASING	SAMPLER	CORE BAR.
TYPE	HSA		SS	NQ
SIZE I.D.	3.75"		1.375"	2.0"
HAMMER WT.			140lbs	
HAMMER FALL			30"	

OFFSET:
LINE & STA.:
N. COORDINATE:
E. COORDINATE:

SURFACE ELEV.:
HOLE NO. B-1

GROUND WATER OBSERVATIONS
AT none FT. AFTER 0 HOURS
AT FT. AFTER HOURS

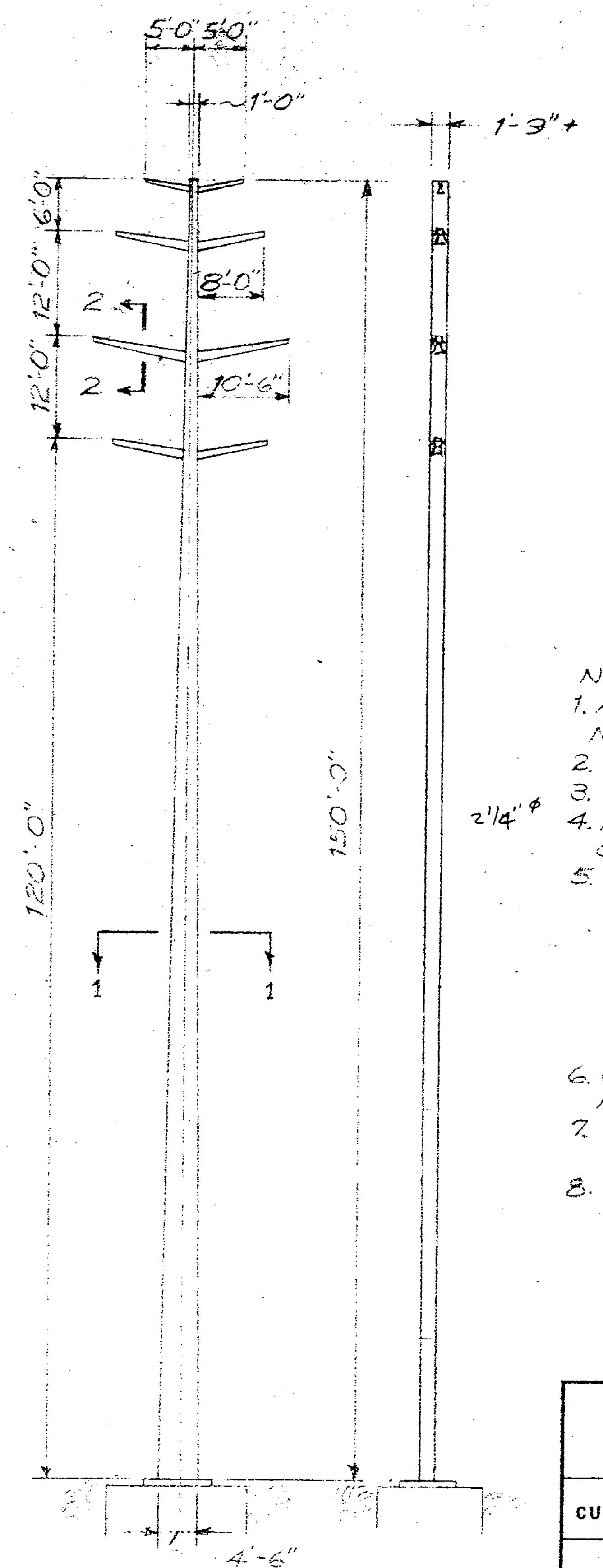
START DATE 7/1/09
FINISH DATE 7/1/09

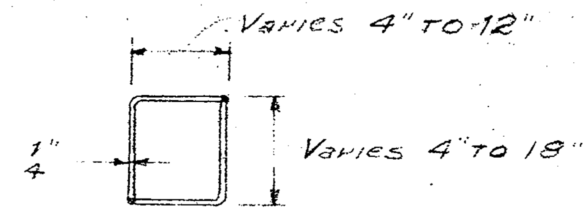
DEPTH	SAMPLE NO.	BLOWS/6"	SAMPLE DEPTH	A	STRATUM DESCRIPTION + REMARKS	ELEV.
0	1	2-6-7-10	0.00'-2.00'		BR.FINE-CRS.SAND, SOME GRAVEL & COBBLES, LITTLE SILT - FILL	
	2	6-3-2-2	2.00'-4.00'			
	3	6-9-8-8	4.00'-6.00'			
5	4	5-7-7-7	6.00'-8.00'			
	5	6-7-7-18	8.00'-10.00'			
10	6	30-20-7-6	10.00'-12.00'			
	7	7-7-60	12.00'-13.50'			
					CONCRETE FOUNDATION	13.5
15						
					CORED - BR.FINE-CRS.SAND AND GRAVEL, FEW COBBLES, LITTLE SILT	16.0
					CORED BEDROCK - GRANITIC GNEISS RUN#1 19.0'- 24.0' RECOVERED 36" RQD=25%	19.0
20						
					BOTTOM OF BORING @ 24'	24.0
25						
30						
35						

LEGEND: COL. A:
SAMPLE TYPE: D=DRY A=AUGER C=CORE U=UNDISTURBED PISTON S=SPLIT SPOON
PROPORTIONS USED: TRACE=0-10% LITTLE=10-20% SOME=20-35% AND=35-50%

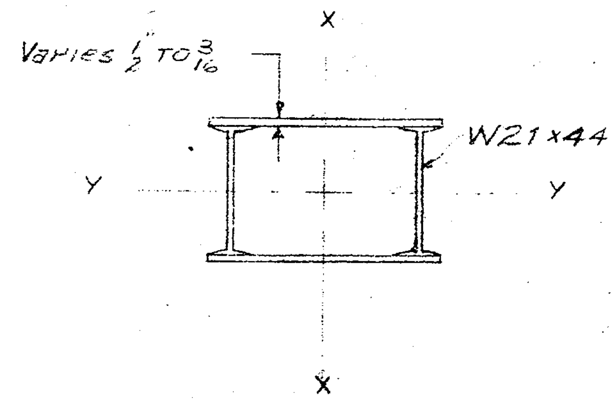
DRILLER: LINDENBERGER
INSPECTOR:

SHEET 1 OF 1 HOLE NO. **B-1**





SECTION 2-2



SECTION 1-1

NOTES:

1. ALL STEEL ASTM A572 GR. 60 EXCEPT AS NOTED.
2. CROSS-ARM STEEL IS ASTM A36.
3. BASE PLATE ASTM A572 GR. 42.
4. ALL ANCHOR BOLTS 18S ASTM A615 GR. 60.
5. WEIGHTS:
   a) POLE - 13.2 TONS
   b) CROSS-ARMS - 1.78T
   c) BASE PLATE - 0.93T
   d) ANCHOR BOLTS - 1.38T
   e) MISCELLANEOUS - 0.25T
   TOTAL ASSEMBLY WEIGHT - 16.7 TONS
6. CONTROLLING LOAD CONDITION IS N.E.S.C. HEAVY WITH TOP CONDUCTOR BROKEN.
7. MAX. GROUND LINE MOMENTS: $M_{x-x} = 2166.2^{'-K}$ $M_{y-y} = 1656.0^{'-K}$
8. POLES ARE ALSO CAPABLE OF RESISTING THE ADDED MOMENTS DUE TO DISPLACED VERTICAL LOADS, WITHOUT EXCEEDING THE YIELD POINT OF THE MATERIAL.

QUOTATION OUTLINE DRAWING

THE FINNEY STEEL POLE CO., INC.
1500 SHAWSHEEN ST. P.O. BOX 306
TEWKSBURY, MASS. 01876

CUSTOMER NORTHEAST UTILITIES P.O. ______

150' TANGENT POLE - 115 KV.

(2 REQ'D)

JOB NO. 1300.8 DWG NO. B-150-1

	Issue	Rev. 1	Rev. 2	Rev. 3	Rev. 4
DWN	4-14-71				
CKD					
APPD					
SHOP					

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: CT11080B

CL&P at MP (Pole 845)
Rocky Hill Road
Trumbull, CT 06611

March 11, 2019

EBI Project Number: 6219000720

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**3.46 %**

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

EBI Consulting
environmental | engineering | due diligence

March 11, 2019

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

Emissions Analysis for Site: **CT11080B –**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **Rocky Hill Road, Trumbull, 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.

<u>General population/uncontrolled exposure</u> limits apply to situations in which the general population 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 population 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 limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) frequency 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 **Rocky Hill Road, Trumbull, 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 for directional panel antennas, 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) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 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.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) Cable losses were factored in the calculations for this site. Since all of the proposed radios are ground mounted the following cable loss values were used. For each ground mounted 600 MHz radio there was 1.24 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 700 MHz radio there was 1.35 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 1900 MHz (PCS) radio there was 2.35 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 2100 MHz (AWS) radio there was 2.49 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 193 feet of 1-1/4" coax

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 for directional panel antennas, 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 **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 **160 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 population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
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):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
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	7	Channel Count	7	Channel Count	7
Total TX Power(W):	295	Total TX Power(W):	295	Total TX Power(W):	295
ERP (W):	7,167.70	ERP (W):	7,167.70	ERP (W):	7,167.70
Antenna A1 MPE%	**1.09**	Antenna B1 MPE%	**1.09**	Antenna C1 MPE%	**1.09**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	1,819.97	ERP (W):	1,819.97	ERP (W):	1,819.97
Antenna A2 MPE%	**0.65**	Antenna B2 MPE%	**0.65**	Antenna C2 MPE%	**0.65**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.74 %**
Verizon Wireless	**1.72** %
Site Total MPE %:	**3.46 %**

T-Mobile Sector A Total:	1.74 %
T-Mobile Sector B Total:	1.74 %
T-Mobile Sector C Total:	1.74 %
Site Total:	3.46 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channel	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile PCS - 1900 MHz GSM	1	372.47	160	0.56	PCS - 1900 MHz	1000.00	0.06%
T-Mobile PCS - 1900 MHz LTE	2	993.25	160	3.01	PCS - 1900 MHz	1000.00	0.30%
T-Mobile AWS - 2100 MHz UMTS	2	961.75	160	2.92	AWS - 2100 MHz	1000.00	0.29%
T-Mobile AWS - 2100 MHz LTE	2	1,442.62	160	4.37	AWS - 2100 MHz	1000.00	0.44%
T-Mobile 600 MHz LTE	2	593.01	160	1.80	600 MHz	400.00	0.44%
T-Mobile 700 MHz LTE	2	316.98	160	0.96	700 MHz	467.00	0.21%
						Total:	**1.74**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population 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 population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	1.74 %
Sector B:	1.74 %
Sector C:	1.74 %
T-Mobile Maximum MPE % (Per Sector):	1.74 %
Site Total:	3.46 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.46%** of the allowable FCC established general population 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.

EVERSOURCE
ENERGY

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

June 21, 2019

Mr. Mark Richard
T-Mobile
35 Griffin Rd. South
Bloomfield, CT 06002

RE: T-Mobile Antenna Site CT-11080B, Rocky Hill Road, Trumbull CT, Eversource Structure 845

Dear Mr. Richard:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at 860-728-4503.

Sincerely,

Joel Szarkowicz

Joel Szarkowicz
Transmission Line Engineering

Ref: 18058.43 - CT11080B Structural Analysis Rev2 19.03.04.pdf
18058.43 - CT11080B CD Rev1 19.06.20 (SS).pdf