September 8, 2020

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

Re: **Notice of Exempt Modification – Antenna and RRU Add**
Property Address: **50 Rockland Road, Norwalk, CT 06854**
Applicant: **AT&T Mobility, LLC**

Dear Ms. Bachman:

On behalf of AT&T, please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16- 50j-72(b) (2).

AT&T currently maintains a wireless telecommunications facility consisting of six (6) wireless telecommunication antennas at an antenna center line height of 161-feet on an existing 180-foot self-support tower, owned by Crown Castle at 3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065. AT&T now intends to install two (2) 6' CCI OPA65R-BU6DA Panel Antennas, and one (1) 4' CCI OPA65R-BU4DA Panel Antenna each currently installed in position [3], all sectors. In addition, AT&T intends to add one (1) RRUS-4478 B14 in position [s], all sectors, for a total of three (3) new RRUs. AT&T is also proposing to add (1) Raycap Squid, as well as one (1) fiber line and (2) DC Power Cables to their equipment configuration. All of the changes will take place on the existing antenna mount.

Attached is a summary of the planned modifications including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

Please accept this letter pursuant to Regulation of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-5I0j-72(b) (2). In accordance with R.C.S.A., a copy of this letter is being sent to William Ireland – Chief Building Official, City of Norwalk at 125 East Ave, Room 121, Norwalk, CT 06851 and Henry W. Rilling – Mayor, City of Norwalk, CT at 125 East Ave, Norwalk, CT 06851. A copy of this letter is being sent to the property owner, Crown Atlantic Company LLC at 4017 Washington RD, McMurray, PA 15317 and to the tower company, Crown Castle at 3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065.

The following is a list of subsequent decisions by the Connecticut Siting Council:

- **EM-CING-057-103-158-157-144-051004** - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 1081 North Street, Greenwich; 50 Rockland Road, Norwalk; 20 Post Office Lane, Westport; 56 Norfield Road, Weston; and Indian Ledge Park, Trumbull, Connecticut.
- **EM-CING-103-110330** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 50 Rockland Road, Norwalk, Connecticut.
- **EM-AT&T-103-150414** - AT&T Mobility notice of intent to modify an existing telecommunications facility located at 50 Rockland Road, Norwalk, Connecticut.
- **EM-AT&T-103-161005** – AT&T notice of intent to modify an existing telecommunications facility located at 50 Rockland Road, Norwalk, Connecticut.
- **EM-AT&T-103b-180509** – AT&T notice of intent to modify an existing telecommunications facility located at 50 Rockland Road, Norwalk, Connecticut.

The planned modifications to AT&T's 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 tower. AT&T's replacement antennas will be installed at the 161-foot level of the 180-foot self-support tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for AT&T's modified facility is provided in the RF Emissions Compliance Report, included in Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

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

Sincerely,

Kristina Cottone

CC w/enclosures:
William Ireland – Chief Building Official, City of Norwalk, CT
Henry W. Rilling – Mayor, City of Norwalk, CT
Crown Atlantic Company – Property Owner
Crown Castle – Tower Company

50 ROCKLAND RD

Location	50 ROCKLAND RD	**Mblu**	5/ 82/ 58/ 0/
Acct#	25665	**Owner**	CROWN ATLANTIC COMPANY LLC
Assessment	$1,007,240	**Appraisal**	$1,438,900
PID	25665	**Building Count**	1

Assessing Distr...

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$991,370	$447,530	$1,438,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$693,970	$313,270	$1,007,240

Owner of Record

Owner	CROWN ATLANTIC COMPANY LLC	**Sale Price**	$1,600,000
Co-Owner		**Certificate**	
Address	PMB 353 4017 WASHINGTON RD McMURRAY, PA 15317-0000	**Book & Page**	3701/331
		Sale Date	04/16/1999

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CROWN ATLANTIC COMPANY LLC	$1,600,000		3701/331	04/16/1999
CELLCO PARTNERSHIP,	$1,020,000		3489/348	04/03/1998
DEVIVO MARIO + WENCHE	$0		0/0	

Building Information

Building 1 : Section 1

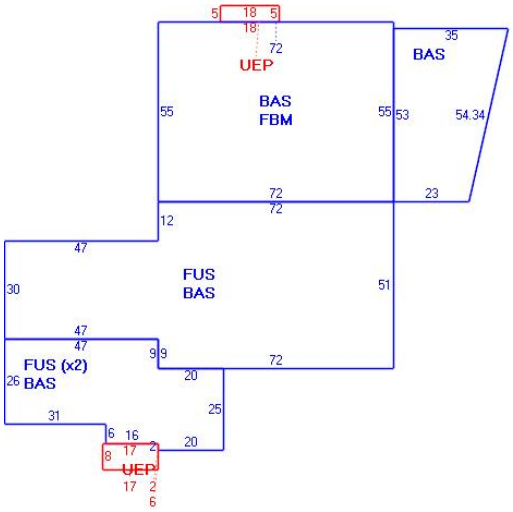
Year Built:	1987
Living Area:	21,115
Replacement Cost:	$1,084,957
Building Percent Good:	47
Replacement Cost Less Depreciation:	$509,930

Building Photo

Building Attributes	
Field	**Description**
STYLE	Light Indust
MODEL	Industrial
Stories:	3.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Concrete
Heating Fuel	Gas
Heating Type	Forced Air
AC Percent	60
Heat Percent	100
Bldg Use	Industrial
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	Heat/AC Pkg
Frame	Masonry
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	13.00
% Sprinkler	40.00

(http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\72/74.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	12,397	12,397
FUS	Finished Upper Story	8,718	8,718
FBM	Finished Basement	3,960	0
UEP	Utility Enclosed Porch	226	0
		25,301	21,115

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
ELV1	Pass Elevator	1.00 UNITS	$21,150	1
A/C	Air Conditioning	12669.00 S.F.	$14,890	1
SPR	Sprinklers	8446.00 S.F.	$7,940	1
ELVS	Elevator per stop	1.00 UNITS	$3,760	1

Land

Land Use

Use Code	301
Description	Industrial
Zone	RI
Neighborhood	C530

Land Line Valuation

Size (Acres)	0.82
Frontage	
Depth	
Assessed Value	$313,270
Appraised Value	$447,530

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asph.			16900.00 S.F.	$17,750	1
FN6	Fence 6'			450.00 L.F.	$3,150	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$6,400	1
CEL1	Cell Tower			5.00 UNITS	$400,000	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$6,400	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$991,370	$447,530	$1,438,900
2013	$991,370	$447,530	$1,438,900
2012	$560,200	$461,300	$1,021,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$693,970	$313,270	$1,007,240
2013	$693,970	$313,270	$1,007,240
2012	$392,140	$322,910	$715,050

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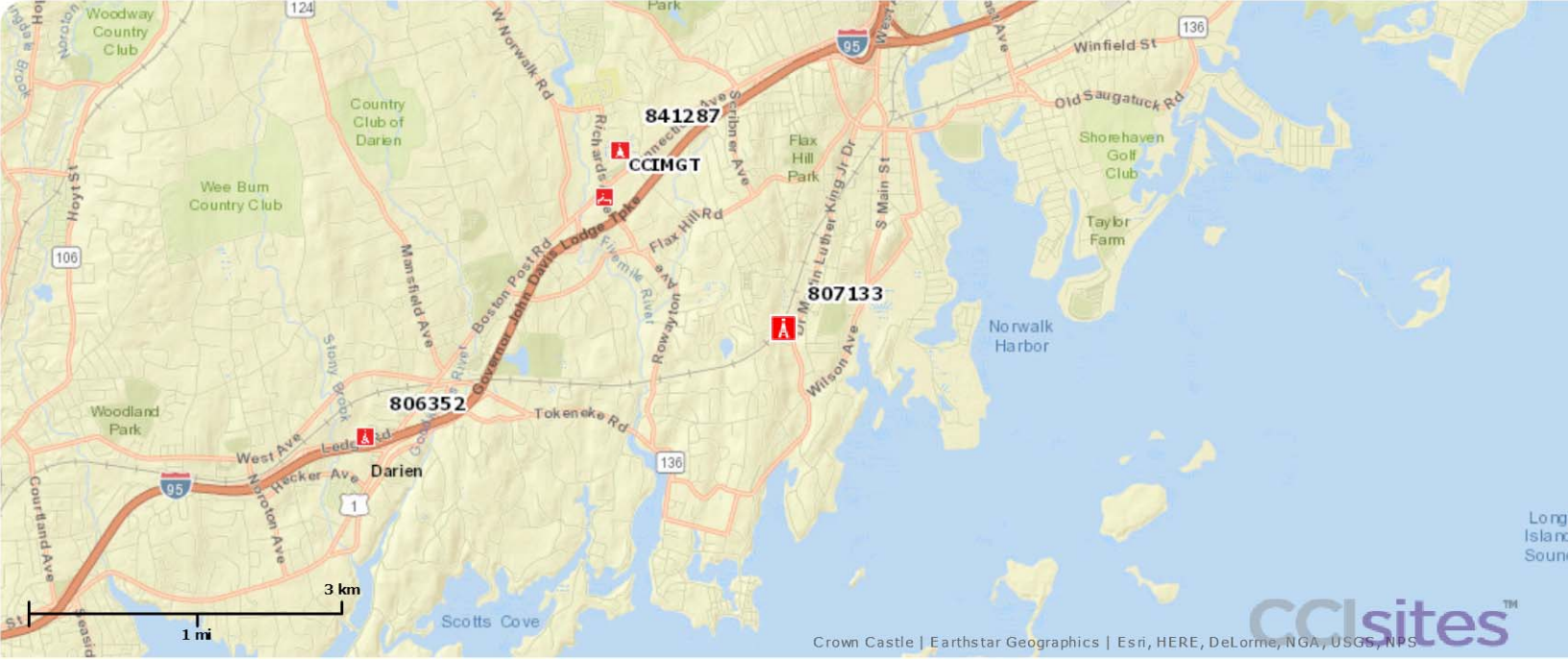
841287
CCIMGT
807133
806352
Darien
Woodway Country Club
Country Club of Darien
Wee Burn Country Club
Woodland Park
Flax Hill Park
Shorehaven Golf Club
Taylor Farm
Norwalk Harbor
Scotts Cove
Winfield St
Old Saugatuck Rd
Flax Hill Rd
Tokeneke Rd
Boston Post Rd
Governor John Davis Lodge Tpke
Mansfield Ave
Rowayton Ave
Wilson Ave
S Main St
Martin Luther King Jr Dr
Richards Ave
Scribner Ave
W Norwalk Rd
Hoyt St
Stony Brook
Fivemile River
West Ave
Leeds Rd
Hecker Ave
Noroton Ave
Courtland Ave
3 km
1 mi
Crown Castle | Earthstar Geographics | Esri, HERE, DeLorme, NGA, USGS, NPS
CCIsites™

DOCKET NO. 73

AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF THREE FACILITIES CONSISTING OF TELECOMMUNICATIONS TOWERS AND ASSOCIATED EQUIPMENT FOR THE PURPOSE OF PROVIDING DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATIONS SERVICE IN THE TOWN OF GREENWICH AND IN THE CITIES OF NORWALK AND STAMFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	April 1, 1987

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc., for the construction, operation, and maintenance of cellular mobile telecommunications equipment in the Town of Greenwich, and the Cities of Norwalk and Stamford, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The Norwalk tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no lights shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

5. The certificate holder shall prepare a development and management (D&M) plan for the Norwalk site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for evergreen screening around the perimeter of the fence at this site, and for other landscaping to improve the appearance of the facility.
6. The receive antennas at the Greenwich and Stamford sites shall be mounted below the high points of the facades of their respective buildings to minimize their visibility.
7. No construction activities shall take place outside the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday.
8. The certificate holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to these facilities.
9. The certificate holder or its successor shall permit public or private entities to share space on the Norwalk tower, for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
10. If these facilities do not provide or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

11. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision.

12. The certificate holder shall comply with any future radio frequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision shall continue to be in compliance with such standards.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Stamford Advocate, the Greenwich Times, the Norwalk Hour, and the Bridgeport Post.

The parties to the proceeding are:

Mr. Armand Mascioli (Applicant)
General Manager
Metro Mobile CTS of Fairfield
County, Inc.
5 Eversley Avenue
Norwalk, Connecticut 06855

Howard L. Slater, Esquire (its attorney)
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, Connecticut 06103

Richard Rubin, Esquire (its attorney)
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D.C. 20036

Southern New England
Telephone Company

(its attorney)

Mr. Peter J. Tyrrell
Senior Attorney
Southern New England
Telephone Company
227 Church Street
New Haven, Connecticut 06506

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 1st day of April, 1987.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner John Downey Designee: Commissioner Peter G. Boucher	Yes
Acting Commissioner John Anderson Designee: Brian Emerick	Yes
Owen L. Clark	Yes
Fred J. Doocy	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Absent
William H. Smith	Absent
Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, April 1, 1987
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

John C. Kelly
Executive Director
Connecticut Siting Council

I certify that a copy of the opinion and decision and order have been forwarded by mail to all parties of record on April 3, 1987.

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

SiteSafe
A QUALTEK Company

8618 Westwood Center Drive, Suite 315, Vienna, VA 22182
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Smartlink on behalf of AT&T Mobility, LLC Site FA – 10035123 Site ID – CTL02122 USID – 60407 Site Name – NORWALK ROCKLAND RD (MRCTB047206)

50 Rockland Road
Norwalk, CT 06854

Latitude: N41-04-52.97
Longitude: W73-25-51.39
Structure Type: Self-Support

Report generated date: September 3, 2020 Report by: Scott Broyles
Customer Contact: Kristina Cottone

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

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1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level at the Antenna Level.	9,093.0% General Public Limit 1" in front of AT&T Mobility, LLC's Alpha Sector Antenna 3
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Will Be Compliant
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: NEW-ENGLAND_CONNECTICUT_CTL02122_2021-LTE-Next-Carrier_LTE_MR673A_2051A0VABB_10035123_60407_03-09-2020_Final-Approved_v1.00

CD's: 10035123_AE201_200724_CTL02122_REV3

RF Powers Used: AT&T Max RRU Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	N	N/A	N

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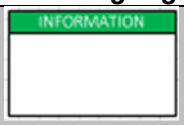
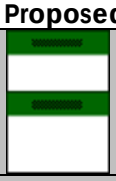
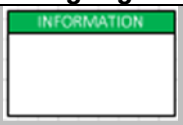
1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2	Warning	Warning 2	Barriers
Access Point(s)									
Alpha									
Beta									
Gamma									

b. Proposed AT&T Signage

AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2B	Warning	Warning 2	Barriers
Access Point(s)						**1**			
Alpha									
Beta									
Gamma									

Note: Caution 2B sign proposed

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2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- RF Exposure Diagram – Detailed View
- AT&T Mobility, LLC Contribution
- Elevation View

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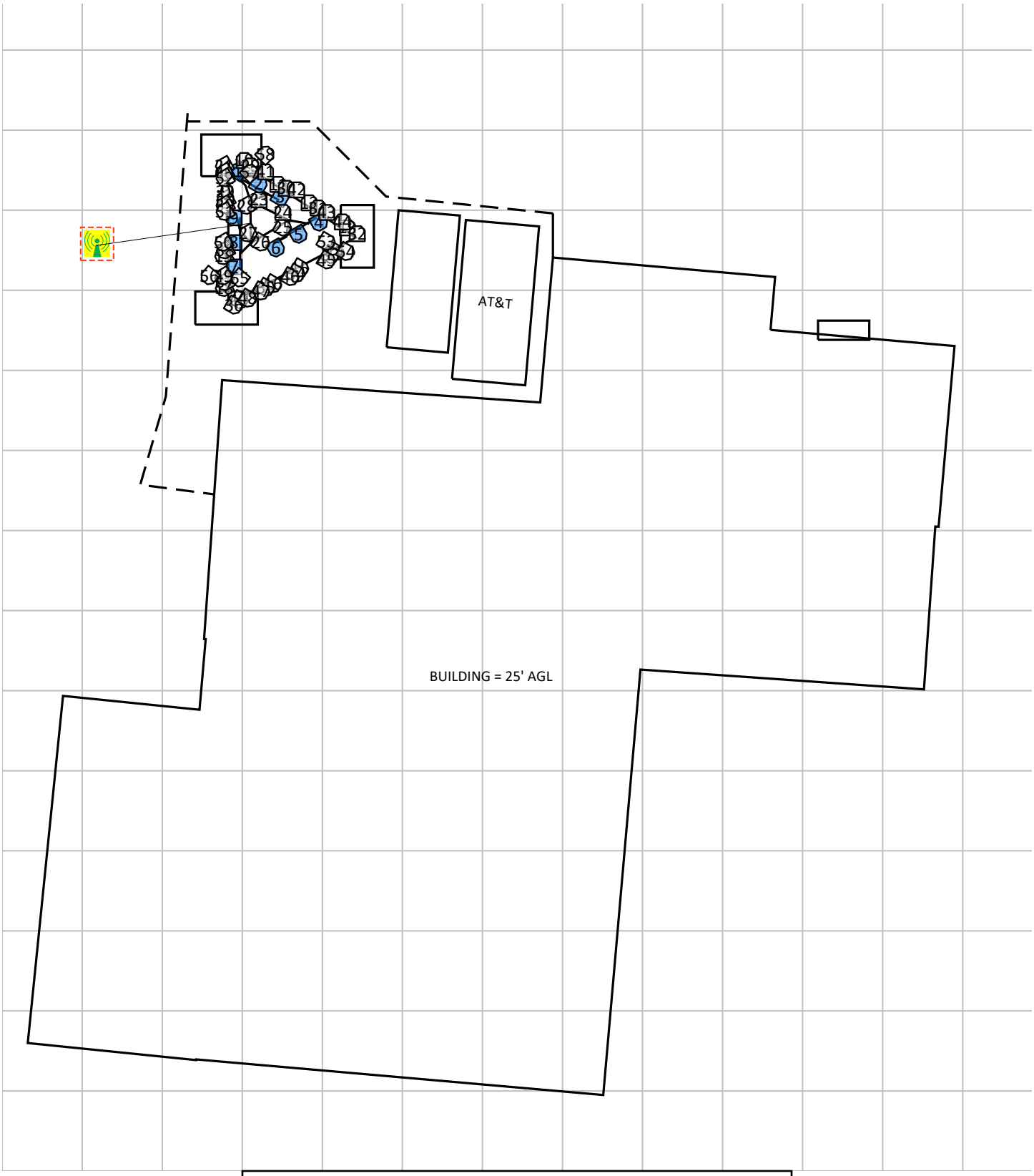
Site Scale Map For: NORWALK ROCKLAND RD



(Feet)

0 10.7 21.4

www.sitesafe.com
9/2/2020 2:39:52 PM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Notice | Notice 2 | Caution | Caution 2B | Warning | Warning 2 | Info | Info 2 | RF Emissions Diagram | Locked Ladder

Existing Barrier | **Proposed Barrier/Sign** | **Remove Sign** X

3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z AGL	MDT	EDT
1	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H6	Panel	850	UMTS	30	66.2	6	40	TPO	Watt	0	1	588.9	11.68	157'	0°	2°
1	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H6	Panel	2100	LTE/AWS-1	30	61.1	6	240	TPO	Watt	0	1	6811	14.53	157'	0°	3°
2	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA65R-BU6A	Panel	763	LTE	30	64.5	5.9	160	TPO	Watt	0	1	2692.3	12.26	157'	0°	2°
3	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	850	LTE	30	63.0	6	80	TPO	Watt	0	1	997.9	10.96	157'	0°	2°
3	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	737	LTE	30	69.0	6	60	TPO	Watt	0	1	839.8	11.46	157'	0°	2°
3	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	2300	LTE	30	64.0	6	100	TPO	Watt	0	1	2857.6	14.56	157'	0°	2°
3	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	30	68.0	6	80	TPO	Watt	0	1	2084.9	14.16	157'	0°	3°
3	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	30	68.0	6	80	TPO	Watt	0	1	2084.9	14.16	157'	0°	3°
4	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H6	Panel	850	UMTS	150	66.2	6	40	TPO	Watt	0	1	588.9	11.68	157'	0°	2°
4	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H6	Panel	2100	LTE/AWS-1	150	61.1	6	240	TPO	Watt	0	1	6811	14.53	157'	0°	3°
5	AT&T MOBILITY LLC (Proposed)	CCI Antennas OPA65R-BU6A	Panel	763	LTE	150	64.5	5.9	160	TPO	Watt	0	1	2692.3	12.26	157'	0°	2°
6	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	850	LTE	150	63.0	6	80	TPO	Watt	0	1	997.9	10.96	157'	0°	2°
6	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	737	LTE	150	69.0	6	60	TPO	Watt	0	1	839.8	11.46	157'	0°	2°
6	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	2300	LTE	150	64.0	6	100	TPO	Watt	0	1	2857.6	14.56	157'	0°	7°
6	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	150	68.0	6	80	TPO	Watt	0	1	2084.9	14.16	157'	0°	4°
6	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	150	68.0	6	80	TPO	Watt	0	1	2084.9	14.16	157'	0°	4°
7	AT&T MOBILITY LLC	Andrew SBNHH-1D65A	Panel	850	UMTS	270	61.0	4.6	40	TPO	Watt	0	1	561.1	11.47	157.7'	0°	10°
7	AT&T MOBILITY LLC	Andrew SBNHH-1D65A	Panel	2100	LTE/AWS-1	270	62.0	4.6	240	TPO	Watt	0	1	6921.7	14.60	157.7'	0°	3°
8	AT&T MOBILITY LLC (Proposed)	Cci OPA65R-BU4D	Panel	763	LTE	270	61.1	4	160	TPO	Watt	0	1	1774.7	10.45	158'	0°	8°
9	AT&T MOBILITY LLC	Quintel QS46512-2	Panel	850	LTE	270	62.0	4.3	80	TPO	Watt	0	1	1044.9	11.16	157.8'	0°	8°
9	AT&T MOBILITY LLC	Quintel QS46512-2	Panel	737	LTE	270	66.0	4.3	60	TPO	Watt	0	1	698.5	10.66	157.8'	0°	8°
9	AT&T MOBILITY LLC	Quintel QS46512-2	Panel	2300	LTE	270	57.0	4.3	100	TPO	Watt	0	1	2167.7	13.36	157.8'	0°	3°
9	AT&T MOBILITY LLC	Quintel QS46512-2	Panel	1900	LTE	270	70.0	4.3	80	TPO	Watt	0	1	1346.1	12.26	157.8'	0°	4°
9	AT&T MOBILITY LLC	Quintel QS46512-2	Panel	1900	LTE	270	70.0	4.3	80	TPO	Watt	0	1	1346.1	12.26	157.8'	0°	4°
10	UNKNOWN CARRIER	Generic	Panel	700		0	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	168.9'	0°	0°

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Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z AGL	MDT	EDT
11	UNKNOWN CARRIER	Generic	Panel	850		0	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	168.9'	0°	0°
12	UNKNOWN CARRIER	Generic	Panel	1900		0	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	168.9'	0°	0°
13	UNKNOWN CARRIER	Generic	Panel	2100		0	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	168.9'	0°	0°
14	UNKNOWN CARRIER	Generic	Panel	700		120	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	168.9'	0°	0°
15	UNKNOWN CARRIER	Generic	Panel	850		120	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	168.9'	0°	0°
16	UNKNOWN CARRIER	Generic	Panel	1900		120	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	168.9'	0°	0°
17	UNKNOWN CARRIER	Generic	Panel	2100		120	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	168.9'	0°	0°
18	UNKNOWN CARRIER	Generic	Panel	700		240	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	168.9'	0°	0°
19	UNKNOWN CARRIER	Generic	Panel	850		240	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	168.9'	0°	0°
20	UNKNOWN CARRIER	Generic	Panel	1900		240	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	168.9'	0°	0°
21	UNKNOWN CARRIER	Generic	Panel	2100		240	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	168.9'	0°	0°
22	UNKNOWN CARRIER	Generic	Aperture	18000		270	2.0	2	0.01	TPO	Watt	0		58.3	37.66	152'	0°	0°
23	UNKNOWN CARRIER	Generic	Panel	1900		0	65.0	6.3	120	TPO	Watt	0		5072	16.26	138.9'	0°	0°
24	UNKNOWN CARRIER	Generic	Panel	2100		0	65.0	6.3	120	TPO	Watt	0		4287.3	15.53	138.9'	0°	0°
25	UNKNOWN CARRIER	Generic	Panel	1900		120	65.0	6.3	120	TPO	Watt	0		5072	16.26	138.9'	0°	0°
26	UNKNOWN CARRIER	Generic	Panel	2100		120	65.0	6.3	120	TPO	Watt	0		4287.3	15.53	138.9'	0°	0°
27	UNKNOWN CARRIER	Generic	Panel	1900		240	65.0	6.3	120	TPO	Watt	0		5072	16.26	138.9'	0°	0°
28	UNKNOWN CARRIER	Generic	Panel	2100		240	65.0	6.3	120	TPO	Watt	0		4287.3	15.53	138.9'	0°	0°
29	UNKNOWN CARRIER	Generic	Panel	700		0	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	128.9'	0°	0°
30	UNKNOWN CARRIER	Generic	Panel	850		0	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	128.9'	0°	0°

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Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z AGL	MDT	EDT
31	UNKNOWN CARRIER	Generic	Panel	1900		0	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	128.9'	0°	0°
32	UNKNOWN CARRIER	Generic	Panel	2100		0	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	128.9'	0°	0°
33	UNKNOWN CARRIER	Generic	Panel	700		120	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	128.9'	0°	0°
34	UNKNOWN CARRIER	Generic	Panel	850		120	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	128.9'	0°	0°
35	UNKNOWN CARRIER	Generic	Panel	1900		120	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	128.9'	0°	0°
36	UNKNOWN CARRIER	Generic	Panel	2100		120	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	128.9'	0°	0°
37	UNKNOWN CARRIER	Generic	Panel	700		240	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	128.9'	0°	0°
38	UNKNOWN CARRIER	Generic	Panel	850		240	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	128.9'	0°	0°
39	UNKNOWN CARRIER	Generic	Panel	1900		240	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	128.9'	0°	0°
40	UNKNOWN CARRIER	Generic	Panel	2100		240	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	128.9'	0°	0°
41	UNKNOWN CARRIER	Generic	Panel	700		0	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	116.9'	0°	0°
42	UNKNOWN CARRIER	Generic	Panel	850		0	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	116.9'	0°	0°
43	UNKNOWN CARRIER	Generic	Panel	1900		0	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	116.9'	0°	0°
44	UNKNOWN CARRIER	Generic	Panel	2100		0	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	116.9'	0°	0°
45	UNKNOWN CARRIER	Generic	Panel	700		120	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	116.9'	0°	0°
46	UNKNOWN CARRIER	Generic	Panel	850		120	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	116.9'	0°	0°
47	UNKNOWN CARRIER	Generic	Panel	1900		120	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	116.9'	0°	0°
48	UNKNOWN CARRIER	Generic	Panel	2100		120	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	116.9'	0°	0°
49	UNKNOWN CARRIER	Generic	Panel	700		240	65.0	6.3	160	TPO	Watt	0		2884.8	12.56	116.9'	0°	0°
50	UNKNOWN CARRIER	Generic	Panel	850		240	65.0	6.3	160	TPO	Watt	0		3524.7	13.43	116.9'	0°	0°

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Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z AGL	MDT	EDT
51	UNKNOWN CARRIER	Generic	Panel	1900		240	65.0	6.3	160	TPO	Watt	0		6762.7	16.26	116.9'	0°	0°
52	UNKNOWN CARRIER	Generic	Panel	2100		240	65.0	6.3	160	TPO	Watt	0		5716.4	15.53	116.9'	0°	0°
53	UNKNOWN CARRIER	Generic	Panel	1900		120	65.0	6.3	100	TPO	Watt	0		4226.7	16.26	106.9'	0°	0°
54	UNKNOWN CARRIER	Generic	Panel	2100		120	65.0	6.3	100	TPO	Watt	0		3572.7	15.53	106.9'	0°	0°
55	UNKNOWN CARRIER	Generic	Panel	1900		220	65.0	6.3	100	TPO	Watt	0		4226.7	16.26	106.9'	0°	0°
56	UNKNOWN CARRIER	Generic	Panel	2100		220	65.0	6.3	100	TPO	Watt	0		3572.7	15.53	106.9'	0°	0°
57	UNKNOWN CARRIER	Generic	Panel	1900		45	65.0	6.3	100	TPO	Watt	0		4226.7	16.26	106.9'	0°	0°
58	UNKNOWN CARRIER	Generic	Panel	2100		45	65.0	6.3	100	TPO	Watt	0		3572.7	15.53	106.9'	0°	0°

Note: The Z reference indicates the bottom of the antenna height **above ground level (AGL).** Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as (Proposed) under Operator or Antenna Make & Model.

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4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

- Ground = 0'
- Building = 25' AGL

The Antenna Inventory heights are referenced to the same level.

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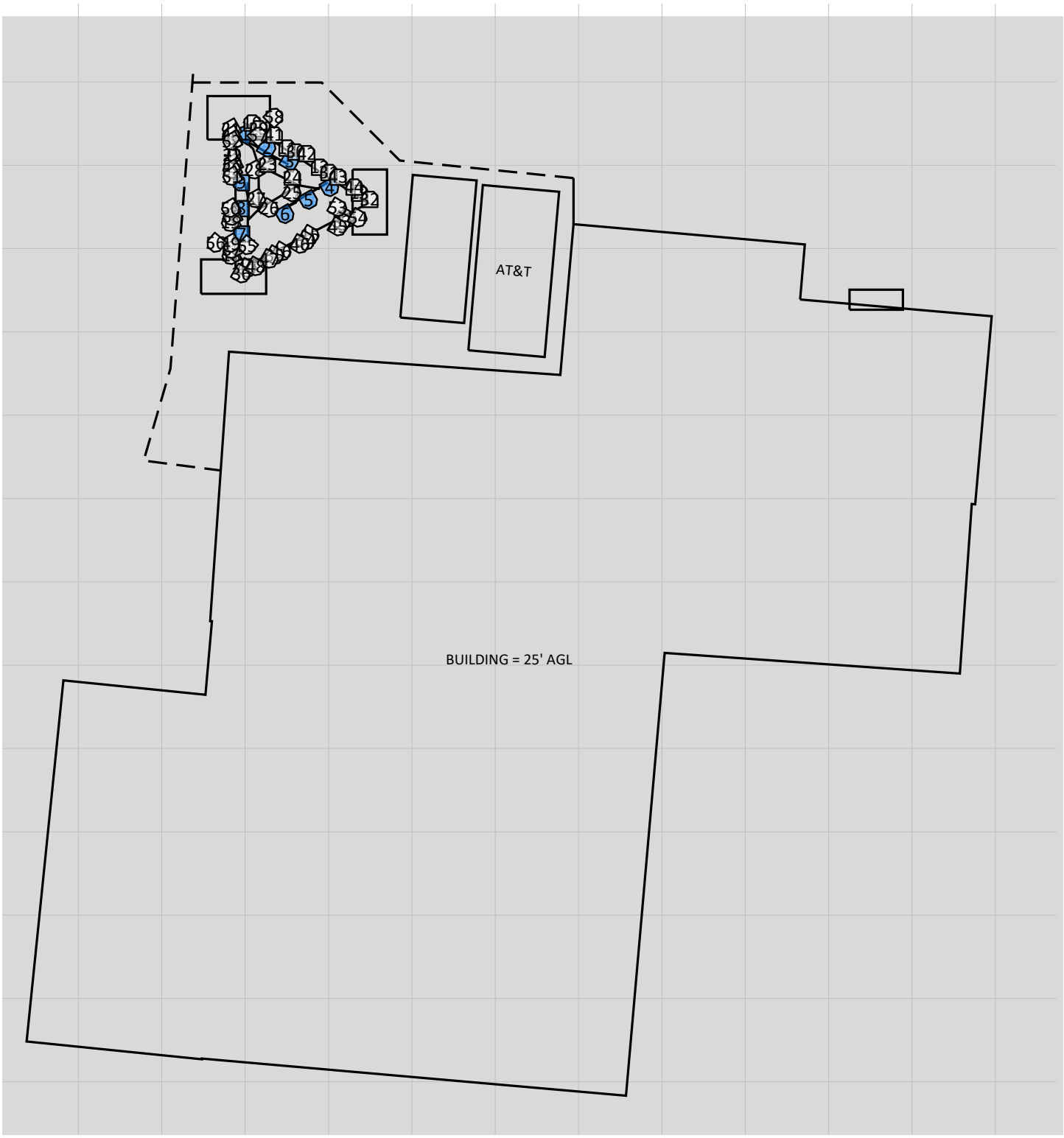
RF Exposure Simulation For: NORWALK ROCKLAND RD
Composite View



% of FCC Public Exposure Limit
Spatially Averaged

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Existing Barrier | **Proposed Barrier/Sign** | **Remove Sign** X | Locked Ladder

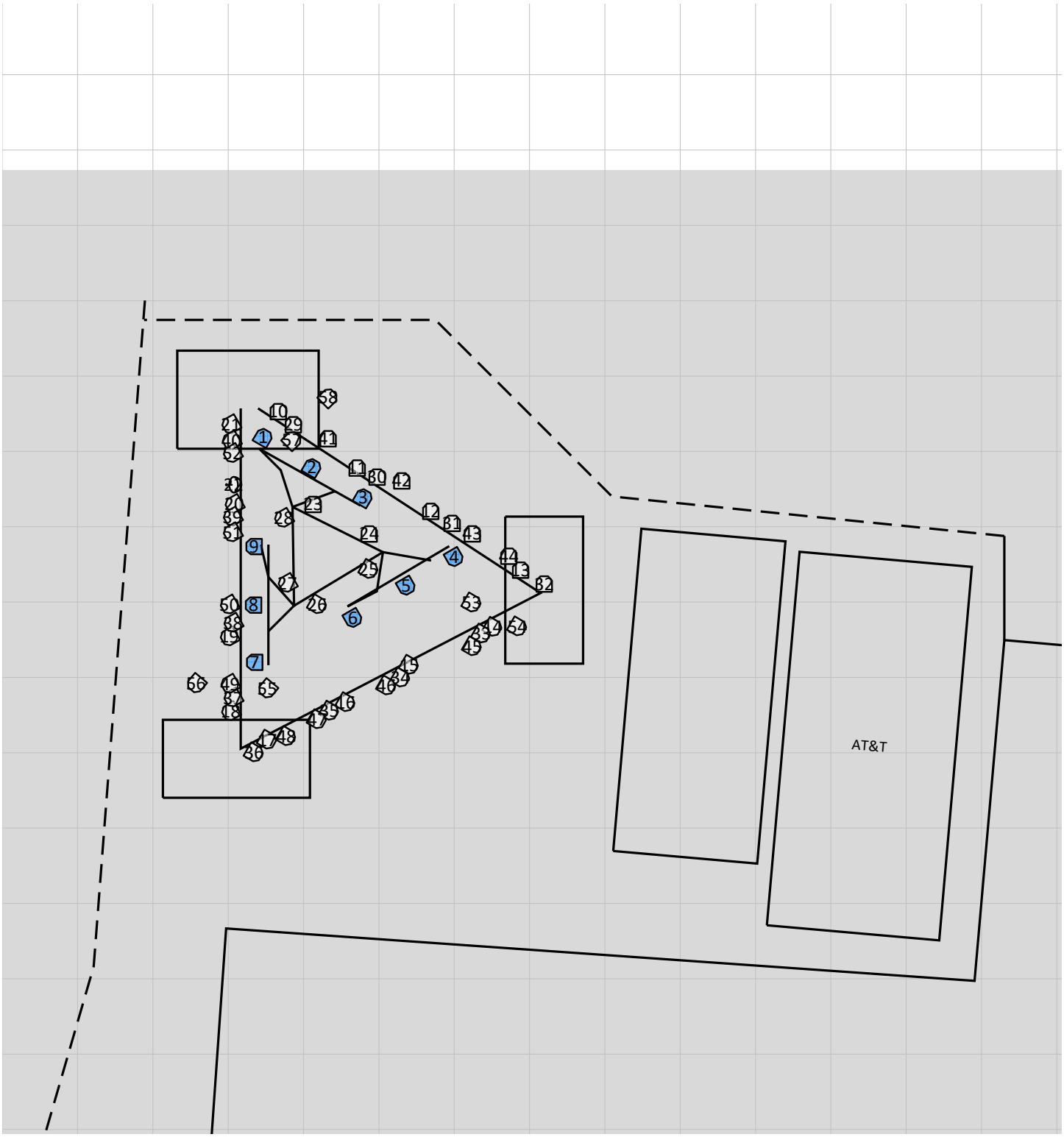
(Feet)

0 11.3 22.6

www.sitesafe.com
9/2/2020 2:31:59 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: NORWALK ROCKLAND RD
Detailed VIew



% of FCC Public Exposure Limit
Spatially Averaged

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

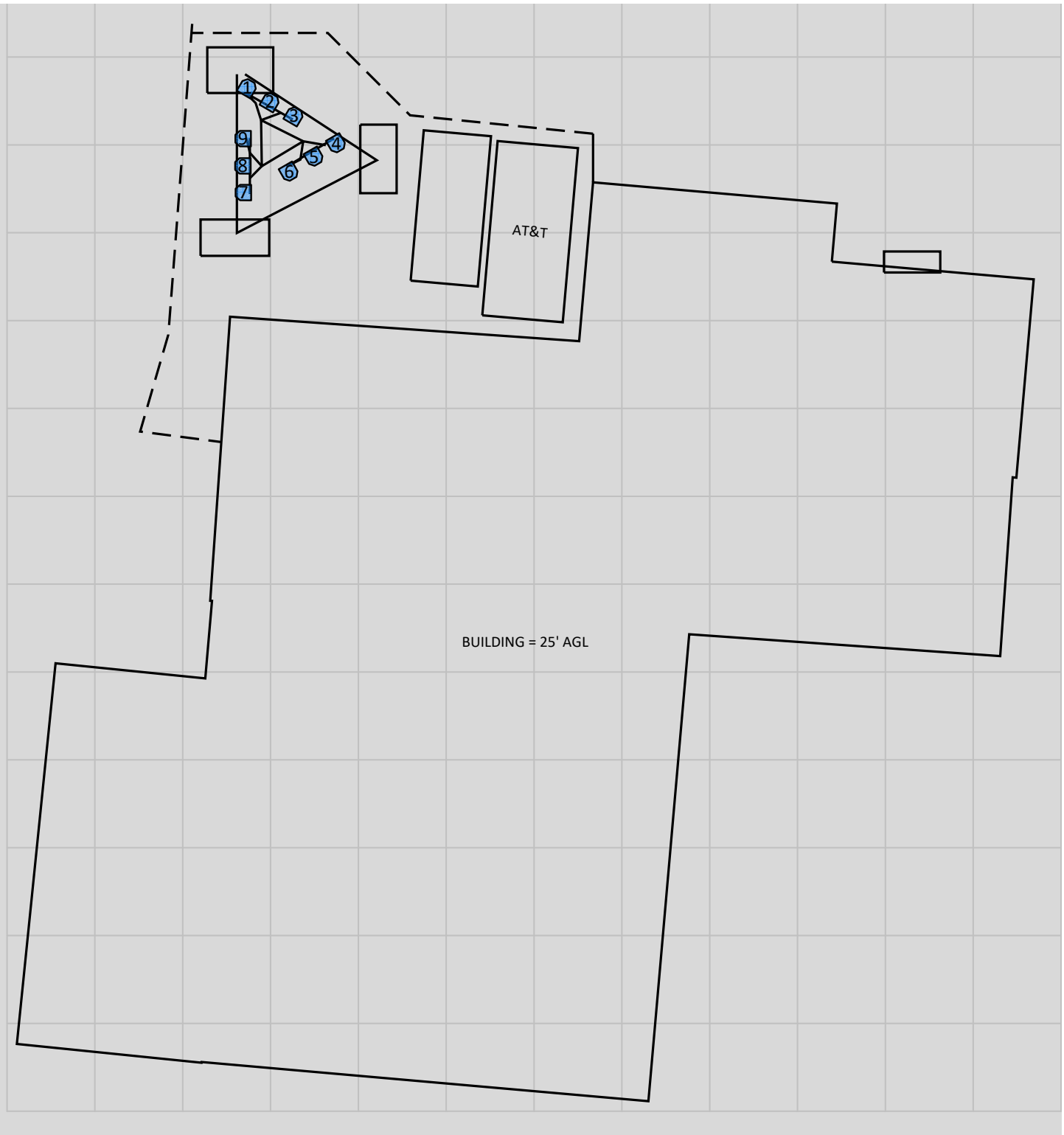
Existing Barrier · **Proposed Barrier/Sign** · **Remove Sign** X · Locked Ladder

(Feet)
0 4.7 9.4

www.sitesafe.com
9/2/2020 2:32:56 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: NORWALK ROCKLAND RD
AT&T Mobility, LLC Contributions



% of FCC Public Exposure Limit
Spatially Averaged

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

Existing Barrier · **Proposed Barrier/Sign** · **Remove Sign** X · Locked Ladder

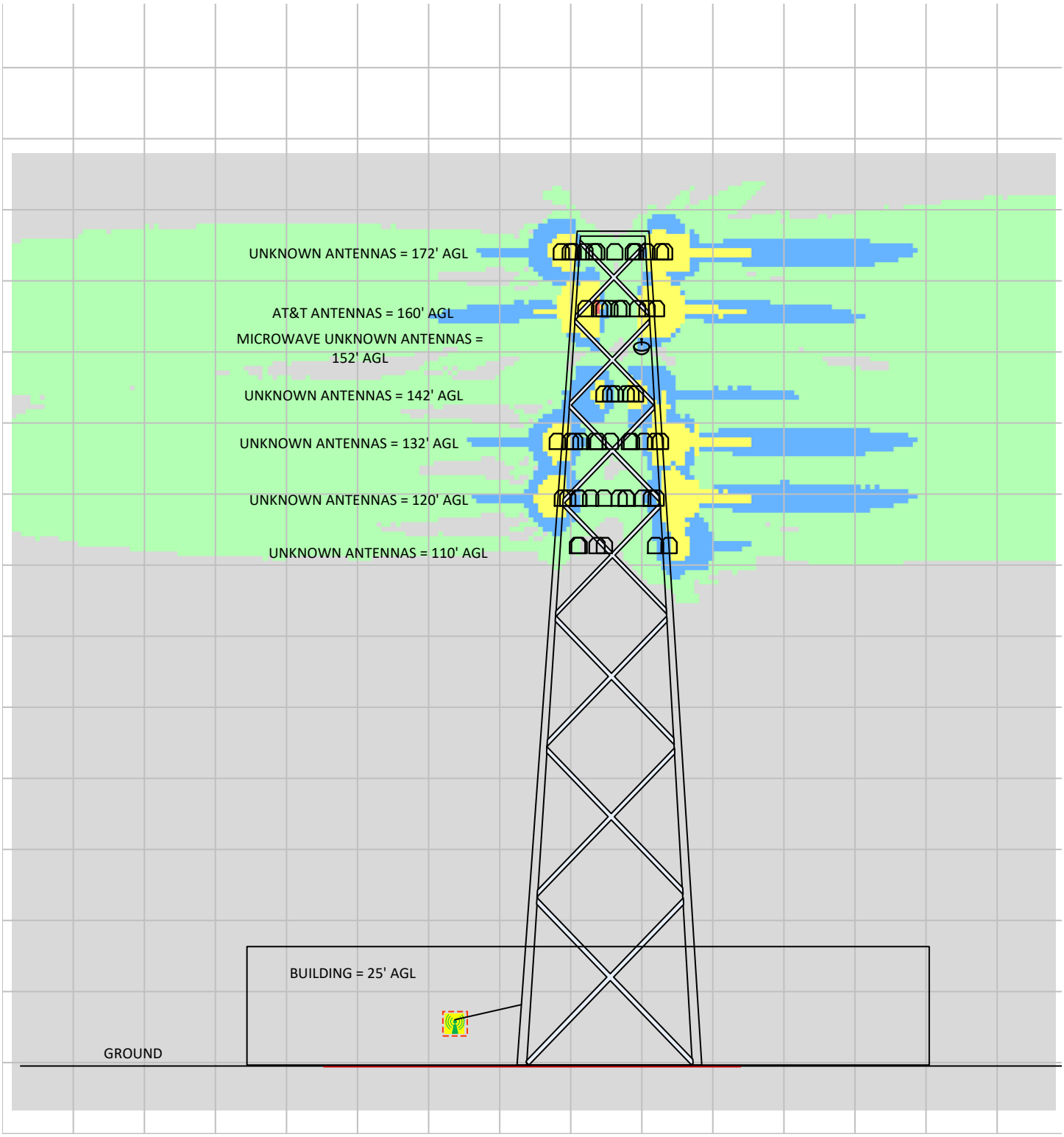
(Feet)

0 10.7 21.4

www.sitesafe.com
9/2/2020 2:45:30 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: NORWALK ROCKLAND RD
Elevation View



% of FCC Public Exposure Limit

% of FCC Public Exposure Limit

0-5	5-100	100-500	500-5000	5000+

Carrier Identification

AT&T MOBILITY LLC · VERIZON WIRELESS · T-MOBILE · SPRINT · UNKNOWN CARRIER

Existing Barrier · **Proposed Barrier/Sign** · **Remove Sign** X · Locked Ladder

(Feet)

0 14.9 29.8

www.sitesafe.com
9/2/2020 2:43:06 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC will be made compliant if the following changes are implemented:

Self-support Tower Access Location

(1) Yellow Caution 2B sign(s) required at each climb point.

Notes:

- Any existing signage that conflicts with the proposed signage in this report should be removed per AT&T Signage Posting Rules.
- Areas where the predicted RF emission level is above 5000% General Public MPE level are located within the near field of the antennas and are restricted by the antenna mounts. Thus, Caution 2 signs are sufficient.
- Signage may already be in place. Sitesafe does not have record of any existing signage because there were no previous visits or data supplied regarding them. All remediation is based on a worst-case scenario.

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6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Scott Broyles.

September 4, 2020

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Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

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Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

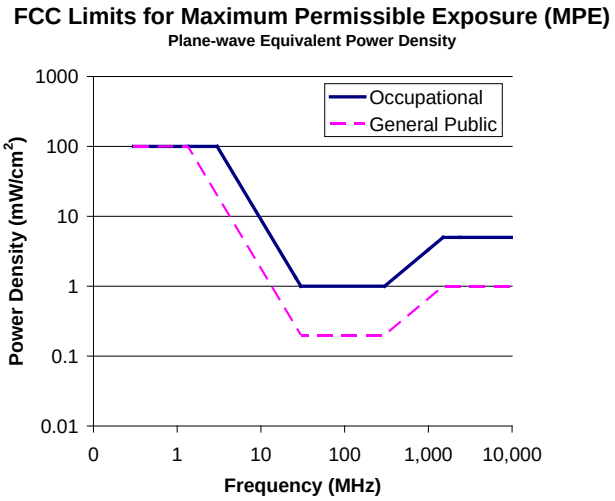
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



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Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

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Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

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Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

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Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

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Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

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Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

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Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteearea=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-Ionizing Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

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Date: **August 04, 2020**

Chanhdara Ratsavong
Crown Castle
6325 Ardrey Kell RddSuite 600
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL02122
	Carrier Site Name:	NORWALK - ROCKLAND ROAD
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	615244
	Crown Castle Work Order Number:	1865544
	Crown Castle Order Number:	525047 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1865544
Site Data:	**50 ROCKLAND ROADNORWALK OFC - MTSO, SO NORWALK, Fairfield County, CT**	
	Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*	
	180 Foot - Self Support Tower	

Dear Chanhdara Ratsavong,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Travis Bussard

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

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1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN. The tower was originally designed for a height of 220 ft but only constructed to a height of 180 ft.

This tower has been modified per reinforcement drawings prepared by Vertical Structures, Inc. in November of 2004. The modifications consist of installation of additional diagonal reinforcement to existing diagonal member from 0' to 20' and 60' to 70' and installation of end bolts for diagonal 20' to 40'.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
161.0	161.0	1	andrew	SBNHH-1D65A	8 6 2	5/8 1-5/8 3/8
		2	cci antennas	HPA-65R-BUU-H6		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		2	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 4426 B66		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 4478 B5		
		1	quintel technology	QS46512-2		
		2	quintel technology	QS66512-2		
		4	raycap	DC6-48-60-18-8F		
		1	tower mounts	Sector Mount [SM 201-3]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	178.0	2	tower mounts	Side Arm Mount [SO 305-1]	-	-
170.0	170.0	1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	6	1-3/8
		1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		1	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	AIR 3246 B66_T-MOBILE w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	AIR6449 B41 w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25_CCIV2		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 702-3]		
157.0	157.0	2	andrew	VHLP2-18	2	7983A
		2	tower mounts	Side Arm Mount [SO 203-1]		
148.0	148.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	4	1-1/4
		3	alcatel lucent	800MHZ 2X50W RRH		
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		9	rfs celwave	ACU-A20-N		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 502-3]		
136.0	138.0	1	andrew	VHLP2-23	6 1 2	5-16 1/2 conduit
	136.0	3	argus technologies	LLPX310R w/ Mount Pipe		
		3	samsung telecommunications	RRH-2WB		
		1	tower mounts	Sector Mount [SM 504-3]		
126.0	130.0	1	gps	GPS_A	19 1	1-5/8 1/2
	128.0	3	alcatel lucent	B13 RRH 4X30		
		3	alcatel lucent	B25 RRH2x60 PCS		
		3	alcatel lucent	B66A RRH4X45		
		6	commscope	SBNHH-1D65C w/ Mount Pipe		
		4	decibel	DB844G65ZAXY w/ Mount Pipe		
		2	decibel	DB844H80-XY w/ Mount Pipe		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		3	rymsa wireless	MG D3-800TV w/ Mount Pipe		
	126.0	1	tower mounts	Sector Mount [SM 411-3]		
112.0	112.0	3	kathrein	800 10504 w/ Mount Pipe	-	-
		1	tower mounts	Sector Mount [SM 104-3]		
5.0	6.0	1	decibel	ASPP2933	2	1/4
	5.0	1	gps	GPS_A		
		1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2311843	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Paul J. Ford	821566	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn	392878	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures, Inc.	1257479	CCISITES
4-POST-MODIFICATION INSPECTION	All Points Technology Corp.	4065020	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.4), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.851	116.138	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.267	167.901	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.492	167.900	16.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-37.347	167.901	22.2	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-73.804	251.347	29.4	Pass
T6	120 - 100	Leg	ROHN 6 EHS	90	-114.785	288.515	39.8	Pass
T7	100 - 80	Leg	ROHN 6 EH	111	-151.860	318.903	47.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	126	-171.561	405.715	42.3	Pass
T9	70 - 60	Leg	ROHN 8 EHS	135	-191.739	405.715	47.3	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-231.942	405.717	57.2	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-272.078	530.833	51.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-312.291	530.833	58.8	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.439	10.104	24.1 29.2 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.393	19.793	22.2 35.4 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.684	17.900	26.2 37.1 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.411	16.240	33.3 44.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.376	12.489	59.1 61.9 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	94	-8.746	17.566	49.8 65.9 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	115	-9.853	18.890	52.2 66.8 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	130	-10.448	17.632	59.3 69.6 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	139	-11.254	27.539	40.9 52.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	148	-11.850	20.589	57.6 77.9 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	163	-12.580	21.559	58.4 66.0 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	178	-13.964	31.656	44.1 63.0 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.088	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.411	4.069	10.1 12.0 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.391	17.663	2.2 6.6 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.545	3.097	17.6	Pass
							Summary	
						Leg (T12)	58.8	Pass
						Diagonal (T10)	77.9	Pass
						Top Girt (T3)	12.0	Pass
						Mid Girt (T1)	17.6	Pass
						Bolt Checks	77.9	Pass
						Rating =	77.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	23.9	Pass
1	Base Foundation	0	83.9	Pass

Structure Rating (max from all components) =	83.9%

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

4.1) Recommendations

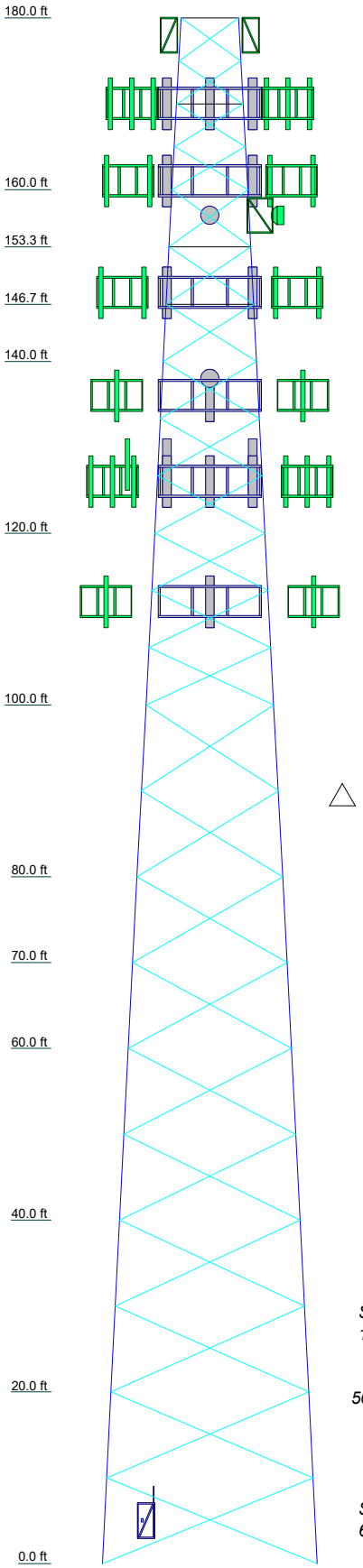
The tower and its foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Legs	ROHN 3 EH	ROHN 4 EH			ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS			ROHN 8 EH	
Leg Grade	A572-50											
Diagonals	L2x2x3/16	L2 1/2x2 1/2x1/4				L3x3x1/4	L3 1/2x3 1/2x1/4		A	L4x4x1/4	L4x4x5/16	2L4x4x5/16x3/8
Diagonal Grade	A36	A572-50						A36		A572-50		A36
Top Girts	L2x2x1/8	N.A.	L2 1/2x2 1/2x1/8			N.A.						
Mid Girts	L2x2x1/8	N.A.										
Face Width (ft)	6.6875	8.76042	9.45052	10.1432	10.8333	12.9167	14.8542	16.9896	17.9948	19	21	23
# Panels @ (ft)	4 @ 5	9 @ 6.66667							10 @ 10			
Weight (K)	1.3	0.6	0.7	0.7	2.4	2.9	3.2	1.8	2.6	3.9	5.2	8.1

33.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 77.9%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 322 K
SHEAR: 40 K

UPLIFT: -268 K
SHEAR: 34 K

AXIAL 177 K
SHEAR 19 K
MOMENT 2022 kip-ft

TORQUE 21 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 77 K
SHEAR 65 K
MOMENT 6437 kip-ft

TORQUE 64 kip-ft
REACTIONS - 120 mph WIND

CROWN CASTLE
The pathway to possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: **BU# 807133**		
Project:		
Client: Crown Castle	Drawn by: Travis Bussard	App'd:
Code: TIA-222-H	Date: 08/04/20	Scale: NTS
Path: R:\SA Models - Letters\Work Area\TBussard\WIP\807133 WO 1865544\Production\Wind\807133.eri		Dwg No. E-1

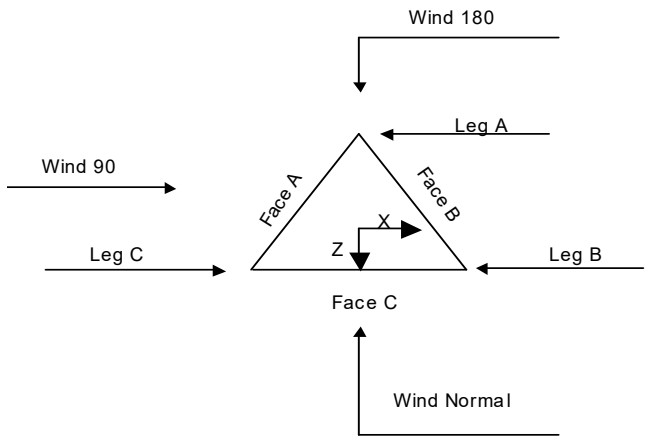
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'8-1/4" at the top and 25' at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Tower base elevation above sea level: 61'.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0'.
9) Nominal ice thickness of 1.500 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.000 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50.000 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) Pressures are calculated at each section.
16) Tower analysis based on target reliabilities in accordance with Annex S.
17) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
18) Stress ratio used in tower member design is 1.05.
19) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	**Poles**
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	180'-160'			6'8-1/4"	1	20'
T2	160'-153'4"			8'9-1/8"	1	6'8"
T3	153'4"-146'8"			9'5-13/32"	1	6'8"
T4	146'8"-140'			10'1-23/32"	1	6'8"
T5	140'-120'			10'10"	1	20'
T6	120'-100'			12'11"	1	20'
T7	100'-80'			14'10-1/4"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-15/16"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	180'-160'	5'	X Brace	No	No	0.000	0.000
T2	160'-153'4"	6'8"	X Brace	No	No	0.000	0.000
T3	153'4"-146'8"	6'8"	X Brace	No	No	0.000	0.000
T4	146'8"-140'	6'8"	X Brace	No	No	0.000	0.000
T5	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T6	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T7	100'-80'	10'	X Brace	No	No	0.000	0.000
T8	80'-70'	10'	X Brace	No	No	0.000	0.000
T9	70'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000
T12	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Leg Type*	*Leg Size*	*Leg Grade*	*Diagonal Type*	*Diagonal Size*	*Diagonal Grade*
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'4"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'4"-146'8"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
T1 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'4"-146'8"	Equal Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146'8"-140'	Single Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T1 180'-160'	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 180'-160'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 160'-153'4"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 153'4"-146'8"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 146'8"-140'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 140'-120'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 120'-100'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 100'-80'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 80'-70'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 70'-60'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	120.000	Mid-Pt	Mid-Pt
T10 60'-40'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 40'-20'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 20'-0'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	152.750	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180'-160'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 160'-153'4"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 153'4"-146'8"	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 146'8"-140'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325N	1	0.625 A325X	0	0.625 A325N	0
T2 160'-153'4"	Flange	0.000 A325N	0	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T3 153'4"-146'8"	Flange	0.000 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T4 146'8"-140'	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T5 140'-120'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T6 120'-100'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T7 100'-80'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T8 80'-70'	Flange	0.000 A325N	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T9 70'-60'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T10 60'-40'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T11 40'-20'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T12 20'-0'	Flange	1.000 A449	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
***													
Feedline Ladder (Af)	B	No	No	Af (CaAa)	180' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
***													
HCS 6X12 6AWG(1-3/8)	A	No	No	Ar (CaAa)	170' - 0'	0.000	0.08	6	6	1.380	1.380		0.002
LDF1-50A(1/4)	A	No	No	Ar (CaAa)	5' - 0'	0.000	0.15	2	2	0.345	0.345		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	170' - 0'	0.000	0	1	1	3.000	3.000		0.008
***													
MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	A	No	No	Ar (CaAa)	148' - 0'	0.000	-0.35	4	4	1.250	1.250		0.000
***													
2-1/4" Rigid Conduit	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	2	2	0.850 0.750	2.250		0.003
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.395	1	1	0.630	0.630		0.000
9207(5/16)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	6	6	0.200	0.330		0.001
7983A(ELLIPTICAL)	A	No	No	Ar (CaAa)	157' - 0'	0.000	-0.405	2	1	0.500	0.573		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	160' - 0'	0.000	-0.36	1	1	3.000	3.000		0.008
***													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	180' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
***													
LDF7-50A(1 5/8)	C	No	No	Ar (CaAa)	126' - 0'	-3.000	-0.4	19	12	1.980	1.980		0.001
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	126' - 0'	-1.000	-0.455	1	1	0.500	0.630		0.000
Feedline Ladder (Af)	C	No	No	Af (CaAa)	126' - 0'	-1.000	-0.4	1	1	3.000	3.000		0.008
***													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	161' - 0'	0.000	0.4	1	1	3.000	3.000		0.008
***													
CR 50 1873(1-5/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.34	6	3	0.850 0.750	1.980		0.001
FB-L98-002-XXX(3/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.36	2	1	0.500	0.394		0.000
WR-VG82ST-BRDA(5/8)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	6	6	0.500	0.645		0.000
WR-VG82ST-BRDA(5/8)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	2	2	0.500	0.645		0.000
***													
Safety Line 3/8	B	No	No	Ar (CaAa)	180' - 0'	0.000	0.5	1	1	0.375	0.375		0.000
***													

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	0.000	0.000	13.280	0.000	0.186
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	12.283	0.000	0.184
T2	160'-153'4"	A	0.000	0.000	12.607	0.000	0.181
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T3	153'4"-146'8"	A	0.000	0.000	13.617	0.000	0.184
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T4	146'8"-140'	A	0.000	0.000	16.284	0.000	0.193
		B	0.000	0.000	3.583	0.000	0.057
		C	0.000	0.000	18.552	0.000	0.162
T5	140'-120'	A	0.000	0.000	60.228	0.000	0.736
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	81.605	0.000	0.632
T6	120'-100'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T7	100'-80'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T8	80'-70'	A	0.000	0.000	31.536	0.000	0.388
		B	0.000	0.000	5.375	0.000	0.086
		C	0.000	0.000	71.077	0.000	0.485
T9	70'-60'	A	0.000	0.000	31.536	0.000	0.388
		B	0.000	0.000	5.375	0.000	0.086
		C	0.000	0.000	71.077	0.000	0.485
T10	60'-40'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T11	40'-20'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970
T12	20'-0'	A	0.000	0.000	63.417	0.000	0.776
		B	0.000	0.000	10.750	0.000	0.172
		C	0.000	0.000	142.155	0.000	0.970

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	1.502	0.000	0.000	31.386	0.000	0.548
		B		0.000	0.000	22.767	0.000	0.448
		C		0.000	0.000	21.147	0.000	0.447
T2	160'-153'4"	A	1.490	0.000	0.000	28.876	0.000	0.516
		B		0.000	0.000	7.556	0.000	0.148
		C		0.000	0.000	39.448	0.000	0.606
T3	153'4"-146'8"	A	1.483	0.000	0.000	33.094	0.000	0.561
		B		0.000	0.000	7.539	0.000	0.148
		C		0.000	0.000	39.371	0.000	0.604
T4	146'8"-140'	A	1.477	0.000	0.000	41.334	0.000	0.652

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		B		0.000	0.000	7.521	0.000	0.147
		C		0.000	0.000	39.292	0.000	0.601
T5	140'-120'	A	1.462	0.000	0.000	162.299	0.000	2.441
		B		0.000	0.000	22.449	0.000	0.438
		C		0.000	0.000	161.206	0.000	2.683
T6	120'-100'	A	1.438	0.000	0.000	170.879	0.000	2.531
		B		0.000	0.000	22.255	0.000	0.431
		C		0.000	0.000	262.304	0.000	4.719
T7	100'-80'	A	1.410	0.000	0.000	169.592	0.000	2.490
		B		0.000	0.000	22.026	0.000	0.424
		C		0.000	0.000	260.896	0.000	4.658
T8	80'-70'	A	1.384	0.000	0.000	84.222	0.000	1.227
		B		0.000	0.000	10.911	0.000	0.209
		C		0.000	0.000	129.821	0.000	2.302
T9	70'-60'	A	1.364	0.000	0.000	83.780	0.000	1.213
		B		0.000	0.000	10.833	0.000	0.206
		C		0.000	0.000	129.337	0.000	2.281
T10	60'-40'	A	1.329	0.000	0.000	165.970	0.000	2.377
		B		0.000	0.000	21.383	0.000	0.404
		C		0.000	0.000	256.935	0.000	4.487
T11	40'-20'	A	1.263	0.000	0.000	162.996	0.000	2.286
		B		0.000	0.000	20.853	0.000	0.388
		C		0.000	0.000	253.680	0.000	4.349
T12	20'-0'	A	1.132	0.000	0.000	159.736	0.000	2.125
		B		0.000	0.000	19.802	0.000	0.357
		C		0.000	0.000	247.229	0.000	4.082

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180'-160'	2.699	1.392	4.544	2.157
T2	160'-153'4"	-9.056	5.371	-10.517	7.687
T3	153'4"-146'8"	-9.012	5.286	-11.103	7.805
T4	146'8"-140'	-10.599	6.043	-12.907	8.719
T5	140'-120'	-6.663	9.160	-9.623	11.986
T6	120'-100'	5.477	11.992	2.393	15.091
T7	100'-80'	6.309	13.793	2.887	17.353
T8	80'-70'	6.615	14.273	3.160	18.081
T9	70'-60'	6.887	14.824	3.387	18.767
T10	60'-40'	6.972	14.888	3.679	19.282
T11	40'-20'	7.419	15.776	4.270	20.312
T12	20'-0'	7.787	16.487	5.096	20.545

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	4	HCS 6X12 6AWG(1-3/8)	160.00 - 170.00	0.6000	0.6000
T1	9	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	20	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	33	Feedline Ladder (Af)	160.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	35	CR 50 1873(1-5/8)	161.00 160.00 - 161.00	0.6000	0.6000
T1	36	FB-L98-002-XXX(3/8)	160.00 - 161.00	0.6000	0.6000
T1	37	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	38	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	40	Safety Line 3/8	160.00 - 161.00	0.6000	0.6000
T2	2	Feedline Ladder (Af)	153.33 - 180.00	0.6000	0.6000
T2	4	HCS 6X12 6AWG(1-3/8)	153.33 - 160.00	0.6000	0.6000
T2	9	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	17	7983A(ELLIPTICAL)	153.33 - 160.00	0.6000	0.6000
T2	18	Feedline Ladder (Af)	153.33 - 157.00	0.6000	0.6000
T2	20	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	33	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	35	CR 50 1873(1-5/8)	153.33 - 160.00	0.6000	0.6000
T2	36	FB-L98-002-XXX(3/8)	153.33 - 160.00	0.6000	0.6000
T2	37	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	38	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	40	Safety Line 3/8	153.33 - 160.00	0.6000	0.6000
T3	2	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	4	HCS 6X12 6AWG(1-3/8)	146.67 - 153.33	0.6000	0.6000
T3	9	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	146.67 - 148.00	0.6000	0.6000
T3	17	7983A(ELLIPTICAL)	146.67 - 153.33	0.6000	0.6000
T3	18	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	20	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	33	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	35	CR 50 1873(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	36	FB-L98-002-XXX(3/8)	146.67 - 153.33	0.6000	0.6000
T3	37	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	38	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	40	Safety Line 3/8	146.67 - 153.33	0.6000	0.6000
T4	2	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	4	HCS 6X12 6AWG(1-3/8)	140.00 - 146.67	0.6000	0.6000
T4	9	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	140.00 - 146.67	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	17	7983A(ELLIPTICAL)	140.00 - 146.67	0.6000	0.6000
T4	18	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	20	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	33	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	35	CR 50 1873(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	36	FB-L98-002-XXX(3/8)	140.00 - 146.67	0.6000	0.6000
T4	37	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	38	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	40	Safety Line 3/8	140.00 - 146.67	0.6000	0.6000
T5	2	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	4	HCS 6X12 6AWG(1-3/8)	120.00 - 140.00	0.6000	0.6000
T5	9	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	120.00 - 140.00	0.6000	0.6000
T5	14	2-1/4" Rigid Conduit	120.00 - 136.00	0.6000	0.6000
T5	15	LDF4-50A(1/2)	120.00 - 136.00	0.6000	0.6000
T5	16	9207(5/16)	120.00 - 136.00	0.0000	0.0000
T5	17	7983A(ELLIPTICAL)	120.00 - 140.00	0.6000	0.6000
T5	18	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	20	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	22	LDF7-50A(1 5/8)	120.00 - 126.00	0.6000	0.6000
T5	24	LDF4-50A(1/2)	120.00 - 126.00	0.6000	0.6000
T5	25	Feedline Ladder (Af)	120.00 - 126.00	0.6000	0.6000
T5	33	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	35	CR 50 1873(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	36	FB-L98-002-XXX(3/8)	120.00 - 140.00	0.6000	0.6000
T5	37	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	38	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	40	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	4	HCS 6X12 6AWG(1-3/8)	100.00 - 120.00	0.6000	0.6000
T6	9	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	100.00 - 120.00	0.6000	0.6000
T6	14	2-1/4" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T6	15	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	16	9207(5/16)	100.00 -	0.0000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	17	7983A(ELLIPTICAL)	120.00 100.00 -	0.6000	0.6000
T6	18	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	20	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	22	LDF7-50A(1 5/8)	120.00 100.00 -	0.6000	0.6000
T6	24	LDF4-50A(1/2)	120.00 100.00 -	0.6000	0.6000
T6	25	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	33	Feedline Ladder (Af)	120.00 100.00 -	0.6000	0.6000
T6	35	CR 50 1873(1-5/8)	120.00 100.00 -	0.6000	0.6000
T6	36	FB-L98-002-XXX(3/8)	120.00 100.00 -	0.6000	0.6000
T6	37	WR-VG82ST-BRDA(5/8)	120.00 100.00 -	0.6000	0.6000
T6	38	WR-VG82ST-BRDA(5/8)	120.00 100.00 -	0.6000	0.6000
T6	40	Safety Line 3/8	120.00 100.00 -	0.6000	0.6000
T7	2	Feedline Ladder (Af)	120.00 80.00 -	0.6000	0.6000
T7	4	HCS 6X12 6AWG(1-3/8)	100.00 80.00 -	0.6000	0.6000
T7	9	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	12	MLE Hybrid 3Power/6Fiber	100.00 80.00 -	0.6000	0.6000
T7	14	RL 2 10AWG(1-1/4) 2-1/4" Rigid Conduit	100.00 80.00 -	0.6000	0.6000
T7	15	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T7	16	9207(5/16)	100.00 80.00 -	0.0000	0.0000
T7	17	7983A(ELLIPTICAL)	100.00 80.00 -	0.6000	0.6000
T7	18	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	20	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	22	LDF7-50A(1 5/8)	100.00 80.00 -	0.6000	0.6000
T7	24	LDF4-50A(1/2)	100.00 80.00 -	0.6000	0.6000
T7	25	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	33	Feedline Ladder (Af)	100.00 80.00 -	0.6000	0.6000
T7	35	CR 50 1873(1-5/8)	100.00 80.00 -	0.6000	0.6000
T7	36	FB-L98-002-XXX(3/8)	100.00 80.00 -	0.6000	0.6000
T7	37	WR-VG82ST-BRDA(5/8)	100.00 80.00 -	0.6000	0.6000
T7	38	WR-VG82ST-BRDA(5/8)	100.00 80.00 -	0.6000	0.6000
T7	40	Safety Line 3/8	100.00 80.00 -	0.6000	0.6000
T8	2	Feedline Ladder (Af)	100.00 70.00 -	0.6000	0.6000
T8	4	HCS 6X12 6AWG(1-3/8)	80.00 70.00 -	0.6000	0.6000
T8	9	Feedline Ladder (Af)	80.00 70.00 -	0.6000	0.6000
			80.00		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T8	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	70.00 - 80.00	0.6000	0.6000
T8	14	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	15	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	16	9207(5/16)	70.00 - 80.00	0.0000	0.0000
T8	17	7983A(ELLIPTICAL)	70.00 - 80.00	0.6000	0.6000
T8	18	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	20	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	22	LDF7-50A(1 5/8)	70.00 - 80.00	0.6000	0.6000
T8	24	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	25	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	33	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	35	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	36	FB-L98-002-XXX(3/8)	70.00 - 80.00	0.6000	0.6000
T8	37	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	38	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	40	Safety Line 3/8	70.00 - 80.00	0.6000	0.6000
T9	2	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	4	HCS 6X12 6AWG(1-3/8)	60.00 - 70.00	0.6000	0.6000
T9	9	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	60.00 - 70.00	0.6000	0.6000
T9	14	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	15	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	16	9207(5/16)	60.00 - 70.00	0.0000	0.0000
T9	17	7983A(ELLIPTICAL)	60.00 - 70.00	0.6000	0.6000
T9	18	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	20	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	22	LDF7-50A(1 5/8)	60.00 - 70.00	0.6000	0.6000
T9	24	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	25	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	33	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	35	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	36	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.6000	0.6000
T9	37	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	38	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	40	Safety Line 3/8	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			70.00		
T10	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	4	HCS 6X12 6AWG(1-3/8)	40.00 - 60.00	0.6000	0.6000
T10	9	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	40.00 - 60.00	0.6000	0.6000
T10	14	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	15	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	16	9207(5/16)	40.00 - 60.00	0.0000	0.0000
T10	17	7983A(ELLIPTICAL)	40.00 - 60.00	0.6000	0.6000
T10	18	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	20	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	22	LDF7-50A(1 5/8)	40.00 - 60.00	0.6000	0.6000
T10	24	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	25	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	33	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	35	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	36	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T10	37	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	38	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	40	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	4	HCS 6X12 6AWG(1-3/8)	20.00 - 40.00	0.6000	0.6000
T11	9	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	20.00 - 40.00	0.6000	0.6000
T11	14	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	15	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	16	9207(5/16)	20.00 - 40.00	0.0000	0.0000
T11	17	7983A(ELLIPTICAL)	20.00 - 40.00	0.6000	0.6000
T11	18	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	20	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	22	LDF7-50A(1 5/8)	20.00 - 40.00	0.6000	0.6000
T11	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	25	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	33	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	35	CR 50 1873(1-5/8)	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T11	36	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T11	37	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	38	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	40	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T12	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	4	HCS 6X12 6AWG(1-3/8)	0.00 - 20.00	0.6000	0.6000
T12	8	LDF1-50A(1/4)	0.00 - 5.00	0.6000	0.6000
T12	9	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	0.00 - 20.00	0.6000	0.6000
T12	14	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	15	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	16	9207(5/16)	0.00 - 20.00	0.0000	0.0000
T12	17	7983A(ELLIPTICAL)	0.00 - 20.00	0.6000	0.6000
T12	18	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	20	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	22	LDF7-50A(1 5/8)	0.00 - 20.00	0.6000	0.6000
T12	24	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	25	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	33	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	35	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	36	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T12	37	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	38	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	40	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 305-1]	B	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.530 0.780 1.060 1.730	1.520 2.070 2.660 3.910	0.030 0.044 0.064 0.125
Side Arm Mount [SO 305-1]	C	From Leg	1.500 0' 0'	0.000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	0.530 0.780 1.060 1.730	1.520 2.070 2.660 3.910	0.030 0.044 0.064 0.125
170 AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0'	0.000	170'	No Ice 1/2"	6.747 7.202	6.070 6.867	0.153 0.214

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	7.648	7.583	0.282
						1" Ice	8.565	9.063	0.441
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	14.690	6.870	0.186
						1/2"	15.460	7.550	0.315
						Ice	16.230	8.250	0.458
						1" Ice	17.820	9.670	0.788
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR 3246 B66_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	8.270	6.635	0.248
						1/2"	8.753	7.483	0.318
						Ice	9.225	8.224	0.397
						1" Ice	10.193	9.754	0.578
						2" Ice			
AIR6449 B41 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
AIR6449 B41 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
AIR6449 B41 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	5.893	3.284	0.118
						1/2"	6.257	3.742	0.167
						Ice	6.630	4.217	0.221
						1" Ice	7.406	5.215	0.350
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000 0' 0'	0.000	170'	No Ice	1.970	1.587	0.073
						1/2"	2.147	1.749	0.093
						Ice	2.331	1.918	0.116
						1" Ice	2.721	2.280	0.170
						2" Ice			
RRUS 4415 B25_CCIV2	A	From Leg	4.000 0'	0.000	170'	No Ice	1.843	0.820	0.046
						1/2"	2.012	0.943	0.060

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
RRUS 4415 B25_CCIV2	B	From Leg	4.000	0.000	170'	No Ice	1.843	0.820	0.046
			0'			1/2"	2.012	0.943	0.060
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
RRUS 4415 B25_CCIV2	C	From Leg	4.000	0.000	170'	No Ice	1.843	0.820	0.046
			0'			1/2"	2.012	0.943	0.060
			0'			Ice	2.190	1.075	0.077
						1" Ice	2.566	1.368	0.118
						2" Ice			
Sector Mount [SM 702-3]	C	None		0.000	170'	No Ice	38.890	38.890	1.551
						1/2"	50.400	50.400	2.279
						Ice	61.770	61.770	3.217
						1" Ice	84.350	84.350	5.705
						2" Ice			
161									
HPA-65R-BUU-H6	A	From Leg	4.000	0.000	161'	No Ice	9.220	4.650	0.048
			0'			1/2"	10.000	5.360	0.105
			0'			Ice	10.790	6.090	0.169
						1" Ice	12.430	7.600	0.316
						2" Ice			
HPA-65R-BUU-H6	B	From Leg	4.000	0.000	161'	No Ice	9.220	4.650	0.048
			0'			1/2"	10.000	5.360	0.105
			0'			Ice	10.790	6.090	0.169
						1" Ice	12.430	7.600	0.316
						2" Ice			
SBNHH-1D65A	C	From Leg	4.000	0.000	161'	No Ice	3.080	1.850	0.034
			0'			1/2"	3.400	2.140	0.073
			0'			Ice	3.730	2.450	0.117
						1" Ice	4.410	3.090	0.222
						2" Ice			
QS66512-2	A	From Leg	4.000	0.000	161'	No Ice	4.010	3.370	0.111
			0'			1/2"	4.410	3.760	0.168
			0'			Ice	4.810	4.150	0.232
						1" Ice	5.650	4.970	0.378
						2" Ice			
QS66512-2	B	From Leg	4.000	0.000	161'	No Ice	4.010	3.370	0.111
			0'			1/2"	4.410	3.760	0.168
			0'			Ice	4.810	4.150	0.232
						1" Ice	5.650	4.970	0.378
						2" Ice			
QS46512-2	C	From Leg	4.000	0.000	161'	No Ice	2.910	2.720	0.075
			0'			1/2"	3.210	3.020	0.120
			0'			Ice	3.520	3.330	0.170
						1" Ice	4.170	3.970	0.286
						2" Ice			
RRUS 4426 B66	A	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 4426 B66	B	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 4426 B66	C	From Leg	4.000	0.000	161'	No Ice	1.644	0.725	0.048
			0'			1/2"	1.804	0.842	0.061
			0'			Ice	1.972	0.969	0.076
						1" Ice	2.329	1.244	0.115
						2" Ice			
RRUS 32 B2	B	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
RRUS 32 B2	A	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
RRUS 32 B2	C	From Leg	4.000	0.000	161'	No Ice	2.731	1.668	0.053
			0'			1/2"	2.953	1.855	0.074
			0'			Ice	3.182	2.049	0.098
						1" Ice	3.663	2.458	0.157
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
DC6-48-60-18-8F	B	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
DC6-48-60-18-8F	C	From Leg	4.000	0.000	161'	No Ice	1.212	1.212	0.020
			0'			1/2"	1.892	1.892	0.042
			0'			Ice	2.105	2.105	0.067
						1" Ice	2.570	2.570	0.126
						2" Ice			
RRUS 11	A	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 11	B	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 11	C	From Leg	4.000	0.000	161'	No Ice	2.784	1.187	0.048
			0'			1/2"	2.992	1.334	0.068
			0'			Ice	3.207	1.490	0.092
						1" Ice	3.658	1.833	0.150
						2" Ice			
RRUS 32	A	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
RRUS 32	B	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
RRUS 32	C	From Leg	4.000	0.000	161'	No Ice	2.857	1.777	0.055
			0'			1/2"	3.083	1.968	0.077
			0'			Ice	3.316	2.166	0.103
						1" Ice	3.805	2.583	0.165
						2" Ice			
Sector Mount [SM 201-3]	C	None		0.000	161'	No Ice	24.760	24.760	1.083
						1/2"	33.890	33.890	1.524
						Ice	43.000	43.000	2.098
						1" Ice	61.440	61.440	3.639
						2" Ice			
OPA65R-BU6D w/ Mount	A	From Leg	4.000	0.000	161'	No Ice	12.250	6.050	0.089

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0' 0'			1/2" Ice 1" Ice 2" Ice	13.000 13.760 15.340	6.710 7.390 8.790	0.176 0.275 0.508
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	12.250 13.000 13.760 15.340	6.050 6.710 7.390 8.790	0.089 0.176 0.275 0.508
OPA65R-BU4D w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	8.100 8.650 9.210 10.390	4.030 4.500 4.980 5.980	0.081 0.142 0.212 0.380
RRUS 4478 B5	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B5	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B5	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	B	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
RRUS 4478 B14	C	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	1.059 1.197 1.342 1.656	0.060 0.076 0.094 0.140
DC6-48-60-18-8F	A	From Leg	4.000 0' 0'	0.000	161'	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.020 0.042 0.067 0.126
157									
Side Arm Mount [SO 203-1]	A	From Leg	1.500 0' 0'	0.000	157'	No Ice 1/2" Ice 1" Ice 2" Ice	1.780 2.240 2.750 3.890	3.790 4.470 5.210 6.780	0.125 0.153 0.189 0.291
Side Arm Mount [SO 203-1]	B	From Leg	1.500 0' 0'	0.000	157'	No Ice 1/2" Ice 1" Ice 2" Ice	1.780 2.240 2.750 3.890	3.790 4.470 5.210 6.780	0.125 0.153 0.189 0.291
148									
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	No Ice 1/2" Ice 1" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.077 0.127 0.185 0.331

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.090	2.860	0.077
						1/2" Ice	4.480	3.230	0.127
						1" Ice	4.880	3.610	0.185
						2" Ice	5.710	4.400	0.331
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.090	2.860	0.077
						1/2" Ice	4.480	3.230	0.127
						1" Ice	4.880	3.610	0.185
						2" Ice	5.710	4.400	0.331
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	4.600	4.010	0.095
						1/2" Ice	5.050	4.450	0.160
						1" Ice	5.500	4.890	0.235
						2" Ice	6.440	5.820	0.419
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
						2" Ice	3.185	3.093	0.173
800MHZ 2X50W RRH	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800MHZ 2X50W RRH	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800MHZ 2X50W RRH	C	From Leg	4.000 0' 0'	0.000	148'	No Ice	2.134	1.773	0.053
						1/2" Ice	2.320	1.946	0.074
						1" Ice	2.512	2.127	0.098
						2" Ice	2.920	2.510	0.157
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000 0' 0'	0.000	148'	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
						2" Ice	1.115	0.674	0.045
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000 0' 0'	0.000	148'	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
						1" Ice	1.115	0.674	0.045

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000	0.000	148'	No Ice	0.660	0.321	0.011
			0'			1/2"	0.763	0.398	0.017
			0'			Ice	0.873	0.483	0.024
						1" Ice	1.115	0.674	0.045
						2" Ice			
(3) ACU-A20-N	A	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
(3) ACU-A20-N	B	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
(3) ACU-A20-N	C	From Leg	4.000	0.000	148'	No Ice	0.067	0.117	0.001
			0'			1/2"	0.104	0.162	0.002
			0'			Ice	0.148	0.215	0.004
						1" Ice	0.259	0.343	0.012
						2" Ice			
Sector Mount [SM 502-3]	C	None		0.000	148'	No Ice	29.820	29.820	1.673
						1/2"	42.210	42.210	2.266
						Ice	54.430	54.430	3.052
						1" Ice	78.490	78.490	5.180
						2" Ice			
136									
LLPX310R w/ Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
LLPX310R w/ Mount Pipe	B	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
LLPX310R w/ Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	3.880	2.360	0.057
			0'			1/2"	4.290	2.730	0.091
			0'			Ice	4.720	3.120	0.133
						1" Ice	5.610	3.940	0.238
						2" Ice			
RRH-2WB	A	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
RRH-2WB	B	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
RRH-2WB	C	From Leg	4.000	0.000	136'	No Ice	2.305	0.783	0.044
			0'			1/2"	2.496	0.917	0.059
			0'			Ice	2.695	1.058	0.077
						1" Ice	3.115	1.361	0.121
						2" Ice			
J - Box	C	From Leg	0.500	0.000	136'	No Ice	0.667	0.500	0.020
			0'			1/2"	0.770	0.593	0.027
			0'			Ice	0.881	0.693	0.036
						1" Ice	1.126	0.915	0.059
						2" Ice			
(3) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	3.060	3.060	0.090
						2" Ice			
(3) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
(3) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 3" Mount Pipe	A	From Leg	4.000	0.000	136'	No Ice	1.767	1.767	0.030
			0'			1/2"	2.129	2.129	0.044
			0'			Ice	2.501	2.501	0.061
						1" Ice	3.272	3.272	0.109
						2" Ice			
6' x 3" Mount Pipe	C	From Leg	4.000	0.000	136'	No Ice	1.767	1.767	0.030
			0'			1/2"	2.129	2.129	0.044
			0'			Ice	2.501	2.501	0.061
						1" Ice	3.272	3.272	0.109
						2" Ice			
Sector Mount [SM 504-3]	C	None		0.000	136'	No Ice	31.050	31.050	1.708
						1/2"	43.830	43.830	2.326
						Ice	56.440	56.440	3.143
						1" Ice	81.280	81.280	5.358
						2" Ice			
126									
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
			0'			1/2"	4.955	5.416	0.080
			2'			Ice	5.340	6.040	0.132
						1" Ice	6.137	7.337	0.257
						2" Ice			
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	4.578	4.802	0.034
			0'			1/2"	4.955	5.416	0.080
			2'			Ice	5.340	6.040	0.132
						1" Ice	6.137	7.337	0.257
						2" Ice			
MG D3-800TV w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
MG D3-800TV w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
MG D3-800TV w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	3.570	3.418	0.037
			0'			1/2"	3.979	4.119	0.071
			2'			Ice	4.387	4.784	0.111
						1" Ice	5.199	6.164	0.210
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	A	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
(2) SBNHH-1D65C w/ Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	5.560	4.470	0.083
			0'			1/2"	6.070	4.970	0.165

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'			Ice	6.590	5.480	0.260
						1" Ice	7.660	6.520	0.494
						2" Ice			
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	2.240	3.340	0.039
			0'			1/2"	2.610	3.730	0.075
			2'			Ice	2.990	4.130	0.117
						1" Ice	3.780	4.970	0.228
						2" Ice			
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	2.240	3.340	0.039
			0'			1/2"	2.610	3.730	0.075
			2'			Ice	2.990	4.130	0.117
						1" Ice	3.780	4.970	0.228
						2" Ice			
GPS_A	B	From Leg	4.000	0.000	126'	No Ice	0.255	0.255	0.001
			0'			1/2"	0.320	0.320	0.005
			4'			Ice	0.393	0.393	0.010
						1" Ice	0.561	0.561	0.025
						2" Ice			
B25 RRH2x60 PCS	A	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
B25 RRH2x60 PCS	B	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
B25 RRH2x60 PCS	C	From Leg	4.000	0.000	126'	No Ice	2.140	1.306	0.051
			0'			1/2"	2.329	1.463	0.068
			2'			Ice	2.526	1.626	0.089
						1" Ice	2.941	1.979	0.139
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	126'	No Ice	4.800	2.000	0.044
			0'			1/2"	5.070	2.193	0.080
			2'			Ice	5.348	2.393	0.120
						1" Ice	5.926	2.815	0.213
						2" Ice			
B66A RRH4X45	A	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B66A RRH4X45	B	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B66A RRH4X45	C	From Leg	4.000	0.000	126'	No Ice	2.580	1.630	0.067
			0'			1/2"	2.794	1.811	0.087
			2'			Ice	3.015	1.999	0.111
						1" Ice	3.479	2.396	0.168
						2" Ice			
B13 RRH 4X30	A	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
B13 RRH 4X30	B	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
B13 RRH 4X30	C	From Leg	4.000	0.000	126'	No Ice	2.055	1.320	0.056
			0'			1/2"	2.241	1.475	0.073

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'			Ice	2.433	1.638	0.093
						1" Ice	2.841	1.997	0.142
						2" Ice			
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	126'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
5' x 2" Pipe Mount	B	From Leg	1.000	0.000	126'	No Ice	1.188	1.188	0.018
			0'			1/2"	1.496	1.496	0.027
			0'			Ice	1.807	1.807	0.040
						1" Ice	2.458	2.458	0.076
						2" Ice			
Sector Mount [SM 411-3]	C	None		0.000	126'	No Ice	20.530	20.530	1.069
						1/2"	28.620	28.620	1.457
						Ice	36.630	36.630	1.972
						1" Ice	52.730	52.730	3.369
						2" Ice			
112									
800 10504 w/ Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
800 10504 w/ Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
800 10504 w/ Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	2.690	2.260	0.038
			0'			1/2"	3.120	2.680	0.067
			0'			Ice	3.560	3.120	0.105
						1" Ice	4.490	4.030	0.206
						2" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	112'	No Ice	1.425	1.425	0.022
			0'			1/2"	1.925	1.925	0.033
			0'			Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice			
Sector Mount [SM 104-3]	C	None		0.000	112'	No Ice	30.210	30.210	0.953
						1/2"	38.120	38.120	1.432
						Ice	46.010	46.010	2.031
						1" Ice	62.030	62.030	3.577
						2" Ice			
102									
5									
GPS_A	A	From Face	2.000	0.000	5'	No Ice	0.255	0.255	0.001
			0'			1/2"	0.320	0.320	0.005
			0'			Ice	0.393	0.393	0.010
						1" Ice	0.561	0.561	0.025

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
ASPP2933	A	From Face	0.500	0.000	5'	No Ice	0.196	0.196	0.004
			0'			1/2"	0.320	0.320	0.006
			1'			Ice	0.453	0.453	0.009
						1" Ice	0.748	0.748	0.021
						2" Ice			
3' x 2" Pipe Mount	A	From Face	2.000	0.000	5'	No Ice	0.583	0.583	0.011
			0'			1/2"	0.770	0.770	0.017
			0'			Ice	0.967	0.967	0.024
						1" Ice	1.388	1.388	0.047
						2" Ice			
Side Arm Mount [SO 701-1]	A	From Face	1.500	0.000	5'	No Ice	0.850	1.670	0.065
			0'			1/2"	1.140	2.340	0.079
			0'			Ice	1.430	3.010	0.093
						1" Ice	2.010	4.350	0.121
						2" Ice			
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	3.000	-10.000		157'	2.175	No Ice	3.720	0.031
				0'					1/2" Ice	4.010	0.050
				0'					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
VHLP2-18	B	Paraboloid w/Shroud (HP)	From Leg	3.000	-40.000		157'	2.175	No Ice	3.720	0.031
				0'					1/2" Ice	4.010	0.050
				0'					1" Ice	4.300	0.070
									2" Ice	4.880	0.110
**											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	4.000	50.000		136'	2.175	No Ice	3.720	0.030
				0'					1/2" Ice	4.000	0.030
				2'					1" Ice	4.310	0.040
									2" Ice	4.940	0.070
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	15	5.181	-0.163	0.014
			Max. Compression	31	-10.851	0.080	0.012
			Max. Mx	14	3.457	-0.651	0.067
			Max. My	17	-2.765	-0.020	0.530
			Max. Vy	22	-1.476	0.040	0.002
			Max. Vx	17	1.352	0.002	-0.121
		Diagonal	Max Tension	24	2.498	0.000	0.000
			Max. Compression	25	-2.439	0.000	0.000
			Max. Mx	38	0.293	0.029	-0.004
			Max. My	34	0.640	0.029	0.004
			Max. Vy	38	0.030	0.029	-0.004
			Max. Vx	34	-0.002	0.000	0.000
		Top Girt	Max Tension	3	0.064	0.000	0.000
			Max. Compression	14	-0.088	0.000	0.000
			Max. Mx	26	-0.043	-0.056	0.000
			Max. My	26	-0.044	0.000	0.002
			Max. Vy	26	0.034	0.000	0.000
			Max. Vx	26	0.001	0.000	0.000
		Mid Girt	Max Tension	19	0.533	0.000	0.000
			Max. Compression	22	-0.545	0.000	0.000
			Max. Mx	26	-0.011	-0.075	0.000
			Max. My	26	-0.010	0.000	0.002
			Max. Vy	26	0.039	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	160 - 153.333	Leg	Max Tension	15	10.154	-0.642	0.067
			Max. Compression	10	-17.267	0.181	-0.020
			Max. Mx	14	9.278	-0.651	0.067
			Max. My	17	-2.833	-0.020	0.530
			Max. Vy	22	-0.205	-0.650	-0.049
			Max. Vx	16	0.209	-0.029	0.530
		Diagonal	Max Tension	13	4.209	0.000	0.000
			Max. Compression	12	-4.393	0.000	0.000
			Max. Mx	28	0.461	0.048	0.006
			Max. My	27	-1.301	0.045	-0.008
			Max. Vy	28	0.042	0.048	0.006
			Max. Vx	27	0.003	0.000	0.000
T3	153.333 - 146.667	Leg	Max Tension	15	18.281	-0.208	-0.002
			Max. Compression	10	-27.492	0.434	-0.041
			Max. Mx	6	15.928	0.541	-0.008
			Max. My	20	-4.103	-0.026	0.551
			Max. Vy	6	0.756	-0.454	-0.008
			Max. Vx	13	0.717	-0.016	-0.387
		Diagonal	Max Tension	13	4.401	0.000	0.000
			Max. Compression	12	-4.684	0.000	0.000
			Max. Mx	31	0.692	0.054	-0.008
			Max. My	28	0.707	0.054	-0.008
			Max. Vy	33	0.045	0.054	-0.007
			Max. Vx	28	0.003	0.000	0.000
		Top Girt	Max Tension	14	0.710	0.000	0.000
			Max. Compression	11	-0.411	0.000	0.000
			Max. Mx	26	0.441	-0.131	0.000
			Max. My	26	0.428	0.000	0.004
			Max. Vy	26	0.055	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T4	146.667 - 140	Leg	Max Tension	15	26.214	-0.447	-0.039
			Max. Compression	10	-37.347	0.163	-0.028
			Max. Mx	6	24.417	-0.454	-0.008
			Max. My	12	-5.583	-0.022	-0.387
			Max. Vy	2	0.101	0.435	0.041
			Max. Vx	13	-0.109	-0.016	-0.387
		Diagonal	Max Tension	13	5.273	0.000	0.000
			Max. Compression	12	-5.411	0.000	0.000
			Max. Mx	31	1.119	0.059	-0.008
			Max. My	35	-1.683	0.052	0.009
			Max. Vy	33	0.047	0.058	-0.008
			Max. Vx	35	-0.003	0.000	0.000
		Top Girt	Max Tension	29	0.391	0.000	0.000
			Max. Compression	11	-0.065	0.000	0.000
			Max. Mx	26	0.354	-0.150	0.000
			Max. My	26	0.352	0.000	0.004
			Max. Vy	26	-0.059	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T5	140 - 120	Leg	Max Tension	15	56.111	-0.355	-0.014
			Max. Compression	10	-73.804	0.494	-0.036
			Max. Mx	6	32.463	0.811	0.017
			Max. My	24	-7.420	-0.010	-0.744
			Max. Vy	14	-1.028	-0.363	-0.014
			Max. Vx	24	0.977	-0.041	0.261
		Diagonal	Max Tension	20	7.354	0.000	0.000
			Max. Compression	20	-7.376	0.000	0.000
			Max. Mx	33	1.697	0.082	-0.011
			Max. My	37	-1.898	0.075	0.011
			Max. Vy	33	0.057	0.082	-0.011
			Max. Vx	37	-0.003	0.000	0.000
T6	120 - 100	Leg	Max Tension	15	92.128	-0.427	0.013
			Max. Compression	2	-114.785	0.787	-0.030
			Max. Mx	3	-112.045	0.789	-0.030
			Max. My	12	-10.143	-0.003	-0.729
			Max. Vy	6	-0.462	-0.568	-0.045
			Max. Vx	17	0.462	-0.019	0.425

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	24	8.772	0.000	0.000
			Max. Compression	24	-8.746	0.000	0.000
			Max. Mx	35	2.238	0.123	0.015
			Max. My	37	-2.264	0.110	0.016
			Max. Vy	33	0.075	0.121	-0.014
			Max. Vx	37	-0.004	0.000	0.000
T7	100 - 80	Leg	Max Tension	15	125.000	-0.512	0.048
			Max. Compression	2	-151.860	0.558	-0.036
			Max. Mx	3	-128.449	0.789	-0.030
			Max. My	16	-12.965	-0.023	0.842
			Max. Vy	6	-0.138	-0.754	-0.085
			Max. Vx	16	0.213	-0.023	0.842
		Diagonal	Max Tension	24	9.919	0.000	0.000
			Max. Compression	24	-9.853	0.000	0.000
			Max. Mx	33	2.536	0.193	0.026
			Max. My	37	-0.198	0.186	0.028
			Max. Vy	33	0.097	0.193	0.026
			Max. Vx	31	0.006	0.000	0.000
T8	80 - 70	Leg	Max Tension	15	142.451	-0.597	0.035
			Max. Compression	2	-171.561	2.209	-0.061
			Max. Mx	2	-171.561	2.209	-0.061
			Max. My	16	-15.264	0.061	2.005
			Max. Vy	2	-0.295	2.209	-0.061
			Max. Vx	16	-0.345	0.061	2.005
		Diagonal	Max Tension	24	10.327	0.000	0.000
			Max. Compression	24	-10.448	0.000	0.000
			Max. Mx	33	2.325	0.216	0.026
			Max. My	37	2.098	0.214	0.028
			Max. Vy	33	0.102	0.216	0.026
			Max. Vx	37	-0.005	0.000	0.000
T9	70 - 60	Leg	Max Tension	15	159.870	-1.984	0.057
			Max. Compression	2	-191.739	0.231	-0.016
			Max. Mx	2	-191.523	2.209	-0.061
			Max. My	16	-16.069	0.061	2.005
			Max. Vy	2	0.326	2.209	-0.061
			Max. Vx	4	-0.356	0.056	-1.992
		Diagonal	Max Tension	24	11.087	0.000	0.000
			Max. Compression	24	-11.254	0.000	0.000
			Max. Mx	33	2.615	-0.368	-0.044
			Max. My	31	-3.042	-0.329	0.053
			Max. Vy	33	-0.172	-0.368	-0.044
			Max. Vx	31	-0.009	0.000	0.000
T10	60 - 40	Leg	Max Tension	15	194.498	-1.226	0.033
			Max. Compression	2	-231.942	1.640	-0.048
			Max. Mx	37	11.907	-2.491	0.071
			Max. My	16	-19.125	0.058	1.380
			Max. Vy	37	0.382	-2.491	0.071
			Max. Vx	17	-0.284	-0.019	1.358
		Diagonal	Max Tension	24	11.568	0.000	0.000
			Max. Compression	24	-11.850	0.000	0.000
			Max. Mx	33	2.362	0.291	0.034
			Max. My	31	-3.410	0.255	-0.039
			Max. Vy	33	0.128	0.290	0.037
			Max. Vx	31	0.007	0.000	0.000
T11	40 - 20	Leg	Max Tension	15	228.355	-0.826	0.013
			Max. Compression	2	-272.078	2.755	-0.078
			Max. Mx	37	14.462	-5.832	0.083
			Max. My	12	-22.083	-0.200	-1.444
			Max. Vy	37	0.977	-5.832	0.083
			Max. Vx	16	0.207	-0.201	1.426
		Diagonal	Max Tension	24	12.245	0.000	0.000
			Max. Compression	24	-12.580	0.000	0.000
			Max. Mx	33	1.563	0.389	0.042
			Max. My	31	4.526	0.318	-0.049
			Max. Vy	33	0.147	0.389	0.042
			Max. Vx	31	0.008	0.000	0.000
T12	20 - 0	Leg	Max Tension	15	260.295	-1.078	0.008
			Max. Compression	2	-312.291	0.000	0.000
			Max. Mx	37	21.126	-5.832	0.083

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	12	-26.062	-0.276	-2.817
			Max. Vy	37	-1.145	-5.832	0.083
			Max. Vx	16	0.436	-0.275	2.748
		Diagonal	Max Tension	24	13.387	0.000	0.000
			Max. Compression	2	-13.964	0.000	0.000
			Max. Mx	33	-0.987	-0.838	-0.072
			Max. My	32	8.036	-0.482	0.098
			Max. Vy	33	-0.266	-0.838	-0.072
			Max. Vx	32	-0.014	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	309.069	33.019	-17.843
	Max. H_x	18	309.069	33.019	-17.843
	Max. H_z	5	-221.283	-24.295	15.149
	Min. Vert	7	-247.892	-27.673	14.821
	Min. H_x	7	-247.892	-27.673	14.821
	Min. H_z	18	309.069	33.019	-17.843
Leg B	Max. Vert	10	312.216	-33.559	-17.966
	Max. H_x	23	-252.699	28.269	14.986
	Max. H_z	25	-233.140	25.203	16.799
	Min. Vert	23	-252.699	28.269	14.986
	Min. H_x	10	312.216	-33.559	-17.966
	Min. H_z	12	279.437	-28.788	-18.798
Leg A	Max. Vert	2	322.418	0.357	40.226
	Max. H_x	21	17.501	3.459	1.690
	Max. H_z	2	322.418	0.357	40.226
	Min. Vert	15	-268.182	-0.363	-34.276
	Min. H_x	8	23.596	-3.468	2.300
	Min. H_z	15	-268.182	-0.363	-34.276

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	64.113	0.000	0.000	38.320	6.802	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	76.936	0.067	-64.920	-6425.326	0.846	15.980
0.9 Dead+1.0 Wind 0 deg - No Ice	57.702	0.067	-64.920	-6436.822	-1.195	15.980
1.2 Dead+1.0 Wind 30 deg - No Ice	76.936	29.923	-51.947	-5193.346	-3005.867	64.386
0.9 Dead+1.0 Wind 30 deg - No Ice	57.702	29.923	-51.947	-5204.842	-3007.908	64.386
1.2 Dead+1.0 Wind 60 deg - No Ice	76.936	48.810	-28.300	-2868.824	-5013.164	44.598
0.9 Dead+1.0 Wind 60 deg - No Ice	57.702	48.810	-28.300	-2880.319	-5015.204	44.598
1.2 Dead+1.0 Wind 90 deg - No Ice	76.936	54.830	-0.030	44.366	-5703.687	35.646
0.9 Dead+1.0 Wind 90 deg - No Ice	57.702	54.830	-0.030	32.870	-5705.727	35.646
1.2 Dead+1.0 Wind 120 deg - No Ice	76.936	52.715	30.521	3150.788	-5345.151	51.244
0.9 Dead+1.0 Wind 120 deg - No Ice	57.702	52.715	30.521	3139.292	-5347.192	51.244
1.2 Dead+1.0 Wind 150 deg	76.936	31.529	54.788	5536.059	-3148.539	28.760

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
- No Ice						
0.9 Dead+1.0 Wind 150 deg - No Ice	57.702	31.529	54.788	5524.563	-3150.580	28.760
1.2 Dead+1.0 Wind 180 deg - No Ice	76.936	-0.075	61.489	6234.232	16.315	-15.697
0.9 Dead+1.0 Wind 180 deg - No Ice	57.702	-0.075	61.489	6222.737	14.275	-15.697
1.2 Dead+1.0 Wind 210 deg - No Ice	76.936	-29.979	52.006	5294.140	3030.452	-64.243
0.9 Dead+1.0 Wind 210 deg - No Ice	57.702	-29.979	52.006	5282.644	3028.412	-64.243
1.2 Dead+1.0 Wind 240 deg - No Ice	76.936	-51.874	30.086	3112.935	5288.340	-44.642
0.9 Dead+1.0 Wind 240 deg - No Ice	57.702	-51.874	30.086	3101.440	5286.299	-44.642
1.2 Dead+1.0 Wind 270 deg - No Ice	76.936	-54.894	0.041	49.026	5729.592	-35.566
0.9 Dead+1.0 Wind 270 deg - No Ice	57.702	-54.894	0.041	37.530	5727.551	-35.566
1.2 Dead+1.0 Wind 300 deg - No Ice	76.936	-49.736	-28.738	-2907.095	5115.325	-51.329
0.9 Dead+1.0 Wind 300 deg - No Ice	57.702	-49.736	-28.738	-2918.591	5113.284	-51.329
1.2 Dead+1.0 Wind 330 deg - No Ice	76.936	-31.529	-54.751	-5438.062	3165.087	-29.021
0.9 Dead+1.0 Wind 330 deg - No Ice	57.702	-31.529	-54.751	-5449.558	3163.046	-29.021
1.2 Dead+1.0 Ice+1.0 Temp	177.116	0.000	-0.000	178.940	-7.139	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	177.116	0.015	-18.727	-1697.103	-8.773	1.136
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	177.116	8.674	-15.045	-1352.783	-889.473	12.852
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	177.116	14.175	-8.208	-672.745	-1476.897	12.874
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	177.116	16.620	-0.007	178.525	-1734.219	14.756
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	177.116	15.569	9.005	1099.058	-1596.186	20.902
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	177.116	9.203	15.975	1792.484	-936.186	16.134
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	177.116	-0.017	18.200	2012.810	-5.322	-1.076
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	177.116	-8.686	15.058	1712.555	876.967	-12.821
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	177.116	-14.652	8.487	1053.985	1502.082	-12.883
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	177.116	-16.633	0.009	179.661	1721.995	-14.739
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	177.116	-15.111	-8.726	-717.908	1545.169	-20.919
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	177.116	-9.203	-15.967	-1433.316	921.956	-16.190
Dead+Wind 0 deg - Service	64.113	0.018	-17.084	-1664.657	4.876	4.205
Dead+Wind 30 deg - Service	64.113	7.875	-13.670	-1340.451	-786.364	16.944
Dead+Wind 60 deg - Service	64.113	12.845	-7.447	-728.735	-1314.600	11.736
Dead+Wind 90 deg - Service	64.113	14.429	-0.008	37.894	-1496.316	9.381
Dead+Wind 120 deg - Service	64.113	13.872	8.032	855.373	-1401.965	13.485
Dead+Wind 150 deg - Service	64.113	8.297	14.418	1483.076	-823.909	7.568
Dead+Wind 180 deg - Service	64.113	-0.020	16.181	1666.806	8.947	-4.131
Dead+Wind 210 deg - Service	64.113	-7.889	13.686	1419.413	802.141	-16.906
Dead+Wind 240 deg - Service	64.113	-13.651	7.917	845.412	1396.322	-11.748
Dead+Wind 270 deg - Service	64.113	-14.446	0.011	39.120	1512.441	-9.359
Dead+Wind 300 deg -	64.113	-13.089	-7.563	-738.806	1350.792	-13.508

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 330 deg - Service	64.113	-8.297	-14.408	-1404.850	837.571	-7.637

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-64.113	0.000	0.000	64.113	0.000	0.000%
2	0.067	-76.936	-64.920	-0.067	76.936	64.920	0.000%
3	0.067	-57.702	-64.920	-0.067	57.702	64.920	0.000%
4	29.923	-76.936	-51.947	-29.923	76.936	51.947	0.000%
5	29.923	-57.702	-51.947	-29.923	57.702	51.947	0.000%
6	48.810	-76.936	-28.300	-48.810	76.936	28.300	0.000%
7	48.810	-57.702	-28.300	-48.810	57.702	28.300	0.000%
8	54.830	-76.936	-0.030	-54.830	76.936	0.030	0.000%
9	54.830	-57.702	-0.030	-54.830	57.702	0.030	0.000%
10	52.715	-76.936	30.521	-52.715	76.936	-30.521	0.000%
11	52.715	-57.702	30.521	-52.715	57.702	-30.521	0.000%
12	31.529	-76.936	54.788	-31.529	76.936	-54.788	0.000%
13	31.529	-57.702	54.788	-31.529	57.702	-54.788	0.000%
14	-0.075	-76.936	61.489	0.075	76.936	-61.489	0.000%
15	-0.075	-57.702	61.489	0.075	57.702	-61.489	0.000%
16	-29.979	-76.936	52.006	29.979	76.936	-52.006	0.000%
17	-29.979	-57.702	52.006	29.979	57.702	-52.006	0.000%
18	-51.874	-76.936	30.086	51.874	76.936	-30.086	0.000%
19	-51.874	-57.702	30.086	51.874	57.702	-30.086	0.000%
20	-54.894	-76.936	0.041	54.894	76.936	-0.041	0.000%
21	-54.894	-57.702	0.041	54.894	57.702	-0.041	0.000%
22	-49.736	-76.936	-28.738	49.736	76.936	28.738	0.000%
23	-49.736	-57.702	-28.738	49.736	57.702	28.738	0.000%
24	-31.529	-76.936	-54.751	31.529	76.936	54.751	0.000%
25	-31.529	-57.702	-54.751	31.529	57.702	54.751	0.000%
26	0.000	-177.116	0.000	0.000	177.116	0.000	0.000%
27	0.015	-177.116	-18.727	-0.015	177.116	18.727	0.000%
28	8.674	-177.116	-15.045	-8.674	177.116	15.045	0.000%
29	14.175	-177.116	-8.208	-14.175	177.116	8.208	0.000%
30	16.620	-177.116	-0.007	-16.620	177.116	0.007	0.000%
31	15.569	-177.116	9.005	-15.569	177.116	-9.005	0.000%
32	9.203	-177.116	15.975	-9.203	177.116	-15.975	0.000%
33	-0.017	-177.116	18.200	0.017	177.116	-18.200	0.000%
34	-8.686	-177.116	15.058	8.686	177.116	-15.058	0.000%
35	-14.652	-177.116	8.487	14.652	177.116	-8.487	0.000%
36	-16.633	-177.116	0.009	16.633	177.116	-0.009	0.000%
37	-15.111	-177.116	-8.726	15.111	177.116	8.726	0.000%
38	-9.203	-177.116	-15.967	9.203	177.116	15.967	0.000%
39	0.018	-64.113	-17.084	-0.018	64.113	17.084	0.000%
40	7.875	-64.113	-13.670	-7.875	64.113	13.670	0.000%
41	12.845	-64.113	-7.447	-12.845	64.113	7.447	0.000%
42	14.429	-64.113	-0.008	-14.429	64.113	0.008	0.000%
43	13.872	-64.113	8.032	-13.872	64.113	-8.032	0.000%
44	8.297	-64.113	14.418	-8.297	64.113	-14.418	0.000%
45	-0.020	-64.113	16.181	0.020	64.113	-16.181	0.000%
46	-7.889	-64.113	13.686	7.889	64.113	-13.686	0.000%
47	-13.651	-64.113	7.917	13.651	64.113	-7.917	0.000%
48	-14.446	-64.113	0.011	14.446	64.113	-0.011	0.000%
49	-13.089	-64.113	-7.563	13.089	64.113	7.563	0.000%
50	-8.297	-64.113	-14.408	8.297	64.113	14.408	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	2.889	44	0.121	0.014
T2	160 - 153.333	2.377	44	0.119	0.014
T3	153.333 - 146.667	2.206	44	0.117	0.013
T4	146.667 - 140	2.039	44	0.115	0.013
T5	140 - 120	1.874	44	0.111	0.013
T6	120 - 100	1.405	44	0.099	0.012
T7	100 - 80	0.989	44	0.083	0.011
T8	80 - 70	0.648	44	0.066	0.009
T9	70 - 60	0.502	44	0.058	0.007
T10	60 - 40	0.380	44	0.049	0.007
T11	40 - 20	0.179	44	0.031	0.004
T12	20 - 0	0.050	39	0.016	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	44	2.838	0.121	0.014	Inf
170'	AIR 32 B2A/B66AA w/ Mount Pipe	44	2.634	0.120	0.014	Inf
161'	HPA-65R-BUU-H6	44	2.403	0.119	0.014	954224
157'	VHLP2-18	44	2.300	0.118	0.013	278575
148'	APXVTM14-ALU-I20 w/ Mount Pipe	44	2.072	0.115	0.013	201911
138'	VHLP2-23	44	1.825	0.110	0.012	126725
136'	LLPX310R w/ Mount Pipe	44	1.777	0.109	0.012	120741
126'	(2) DB844G65ZAXY w/ Mount Pipe	44	1.541	0.103	0.012	102051
112'	800 10504 w/ Mount Pipe	44	1.230	0.093	0.012	73532
5'	GPS_A	39	0.009	0.004	0.000	192531

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	10.963	3	0.456	0.055
T2	160 - 153.333	9.023	3	0.451	0.052
T3	153.333 - 146.667	8.376	3	0.444	0.050
T4	146.667 - 140	7.741	3	0.434	0.049
T5	140 - 120	7.116	3	0.420	0.048
T6	120 - 100	5.338	3	0.374	0.046
T7	100 - 80	3.763	3	0.313	0.041
T8	80 - 70	2.468	3	0.250	0.033
T9	70 - 60	1.915	3	0.220	0.028
T10	60 - 40	1.453	3	0.187	0.025
T11	40 - 20	0.685	3	0.118	0.015
T12	20 - 0	0.192	3	0.061	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178'	Side Arm Mount [SO 305-1]	3	10.769	0.456	0.054	647233
170'	AIR 32 B2A/B66AA w/ Mount Pipe	3	9.994	0.455	0.054	323617
161'	HPA-65R-BUU-H6	3	9.121	0.452	0.052	312107
157'	VHLP2-18	3	8.731	0.448	0.051	77350
148'	APXVTM14-ALU-I20 w/ Mount Pipe	3	7.867	0.436	0.049	54648
138'	VHLP2-23	3	6.931	0.415	0.047	33563
136'	LLPX310R w/ Mount Pipe	3	6.748	0.411	0.047	31952
126'	(2) DB844G65ZAXY w/ Mount Pipe	3	5.854	0.389	0.046	26961
112'	800 10504 w/ Mount Pipe	3	4.677	0.351	0.044	19479
5'	GPS_A	3	0.033	0.016	0.001	50488

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.875	4	1.295	41.556	0.031	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	2.498	8.135	0.307	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.064	5.423	0.012	1.05	Member Block Shear
		Mid Girt	A325N	0.625	1	0.533	5.423	0.098	1.05	Member Block Shear
T2	160	Diagonal	A325N	0.625	1	4.209	11.310	0.372	1.05	Member Bearing
T3	153.333	Diagonal	A325N	0.625	1	4.401	11.310	0.389	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.710	5.655	0.126	1.05	Member Bearing
T4	146.667	Leg	A325N	1.000	4	6.554	54.517	0.120	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	5.273	11.310	0.466	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.391	5.655	0.069	1.05	Member Bearing
T5	140	Leg	A325N	1.000	6	9.352	54.517	0.172	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.354	11.310	0.650	1.05	Member Bearing
T6	120	Leg	A325N	1.000	6	15.355	54.517	0.282	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	8.772	12.675	0.692	1.05	Member Bearing
T7	100	Leg	A325N	1.000	8	15.625	54.517	0.287	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.919	14.137	0.702	1.05	Member Bearing
T8	80	Diagonal	A325N	0.750	1	10.327	14.137	0.730	1.05	Member Bearing
T9	70	Leg	A325N	1.000	8	19.984	54.517	0.367	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.087	20.227	0.548	1.05	Gusset Bearing
T10	60	Leg	A325N	1.000	8	24.312	54.517	0.446	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.568	14.137	0.818	1.05	Member Bearing
T11	40	Leg	A325N	1.000	8	28.544	54.517	0.524	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	12.245	17.672	0.693	1.05	Member Bearing
T12	20	Diagonal	A325N	0.750	1	13.387	20.227	0.662	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16''	5'3/32"	52.9 K=1.00	3.016	-10.851	110.608	0.098 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-17.267	159.906	0.108 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-27.492	159.905	0.172 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-37.347	159.906	0.234 [1]
T5	140 - 120	ROHN 5 EH	20'7/16''	6'8-5/32"	43.6 K=1.00	6.112	-73.804	239.378	0.308 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0 K=1.00	6.713	-114.785	274.776	0.418 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32''	54.8 K=1.00	8.405	-151.860	303.717	0.500 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32''	10'7/32''	41.2 K=1.00	9.719	-171.561	386.395	0.444 [1]
T9	70 - 60	ROHN 8 EHS	10'7/32''	10'7/32''	41.2 K=1.00	9.719	-191.739	386.395	0.496 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32''	41.2 K=1.00	9.719	-231.942	386.397	0.600 [1]
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32''	41.8 K=1.00	12.763	-272.078	505.555	0.538 [1]
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32''	41.8 K=1.00	12.763	-312.291	505.555	0.618 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8"	4'9-15/32"	145.8 K=1.00	0.715	-2.439	9.623	0.253 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	134.4 K=1.00	1.190	-4.393	18.851	0.233 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	141.4 K=1.00	1.190	-4.684	17.047	0.275 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	148.4 K=1.00	1.190	-5.411	15.466	0.350 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-3/32"	169.2 K=1.00	1.190	-7.376	11.895	0.620 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	157.0 K=1.00	1.440	-8.746	16.730	0.523 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	164.0 K=1.00	1.690	-9.853	17.990	0.548 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	169.7 K=1.00	1.690	-10.448	16.792	0.622 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32"	10'3-3/32"	189.4 K=1.00	3.380	-11.254	26.228	0.429 [1]
T10	60 - 40	2L 'a' > 58.773 in - 139 L4x4x1/4	22'9-23/32"	11'1-25/32"	168.3 K=1.00	1.940	-11.850	19.609	0.604 [1]
T11	40 - 20	L4x4x5/16	24'7-1/2"	12'11/16"	182.9 K=1.00	2.400	-12.580	20.532	0.613 [1]
T12	20 - 0	2L4x4x5/16x3/8	26'5-9/16"	12'11-3/4"	211.6 K=1.00	4.800	-13.964	30.149	0.463 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
		2L 'a' > 74.511 in - 178							

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	185.5 K=1.00	0.484	-0.088	4.028	0.022 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 48	9'5-13/32"	8'9-29/32"	212.2 K=1.00	0.609	-0.411	3.875	0.106 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 60	10'1-23/32"	9'6-7/32"	228.8 K=1.00	0.609	-0.065	3.331	0.020 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8 KL/R > 200 (C) - 9	7'8-11/16"	7'2-3/16"	216.8 K=1.00	0.484	-0.545	2.950	0.185 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16''	5'3/32"	52.9	3.016	5.181	135.717	0.038 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	10.154	198.335	0.051 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	18.281	198.335	0.092 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	26.214	198.335	0.132 [1]
T5	140 - 120	ROHN 5 EH	20'7/16''	6'8-5/32"	43.6	6.112	56.111	275.039	0.204 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0	6.713	92.128	302.097	0.305 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32''	54.8	8.405	125.000	378.222	0.330 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32''	10'7/32''	41.2	9.719	142.451	437.369	0.326 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	70 - 60	ROHN 8 EHS	10'7/32''	10'7/32''	41.2	9.719	159.870	437.369	0.366 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32''	10'7/32''	41.2	9.719	194.498	437.369	0.445 [1]
T11	40 - 20	ROHN 8 EH	20'13/32''	10'7/32''	41.8	12.763	228.355	574.322	0.398 [1]
T12	20 - 0	ROHN 8 EH	20'13/32''	10'7/32''	41.8	12.763	260.295	574.322	0.453 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8''	4'9-15/32''	95.6	0.431	2.498	18.739	0.133 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16''	5'6''	87.8	0.752	4.209	32.707	0.129 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32''	5'9-13/32''	92.2	0.752	4.401	32.707	0.135 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32''	6'7/8''	96.7	0.752	5.273	32.707	0.161 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4''	6'11-3/32''	110.0	0.752	7.354	32.707	0.225 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8''	7'8-29/32''	101.5	0.939	8.772	45.794	0.192 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32''	9'5-25/32''	105.9	1.103	9.919	53.793	0.184 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16''	9'9-25/32''	109.6	1.103	10.327	53.793	0.192 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8	21'11/32''	10'3-3/32''	114.4	2.207	11.087	95.999	0.115 [1]
T10	60 - 40	2L 'a' > 58.773 in - 138 L4x4x1/4	22'9-23/32''	11'1-25/32''	108.3	1.291	11.568	62.933	0.184 [1]
T11	40 - 20	L4x4x5/16	24'7-1/2''	12'11/16''	118.0	1.595	12.245	77.752	0.157 [1]
T12	20 - 0	2L4x4x5/16x3/8	26'5-9/16''	12'11-3/4''	126.9	3.190	13.387	138.758	0.096 [1]
		2L 'a' > 74.511 in - 177							

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4''	6'1-3/4''	122.6	0.293	0.064	12.744	0.005 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/32''	8'9-29/32''	138.3	0.387	0.710	16.822	0.042 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8	10'1-23/32''	9'6-7/32''	148.9	0.387	0.391	16.822	0.023 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16"	142.4	0.293	0.533	12.744	0.042 [1]

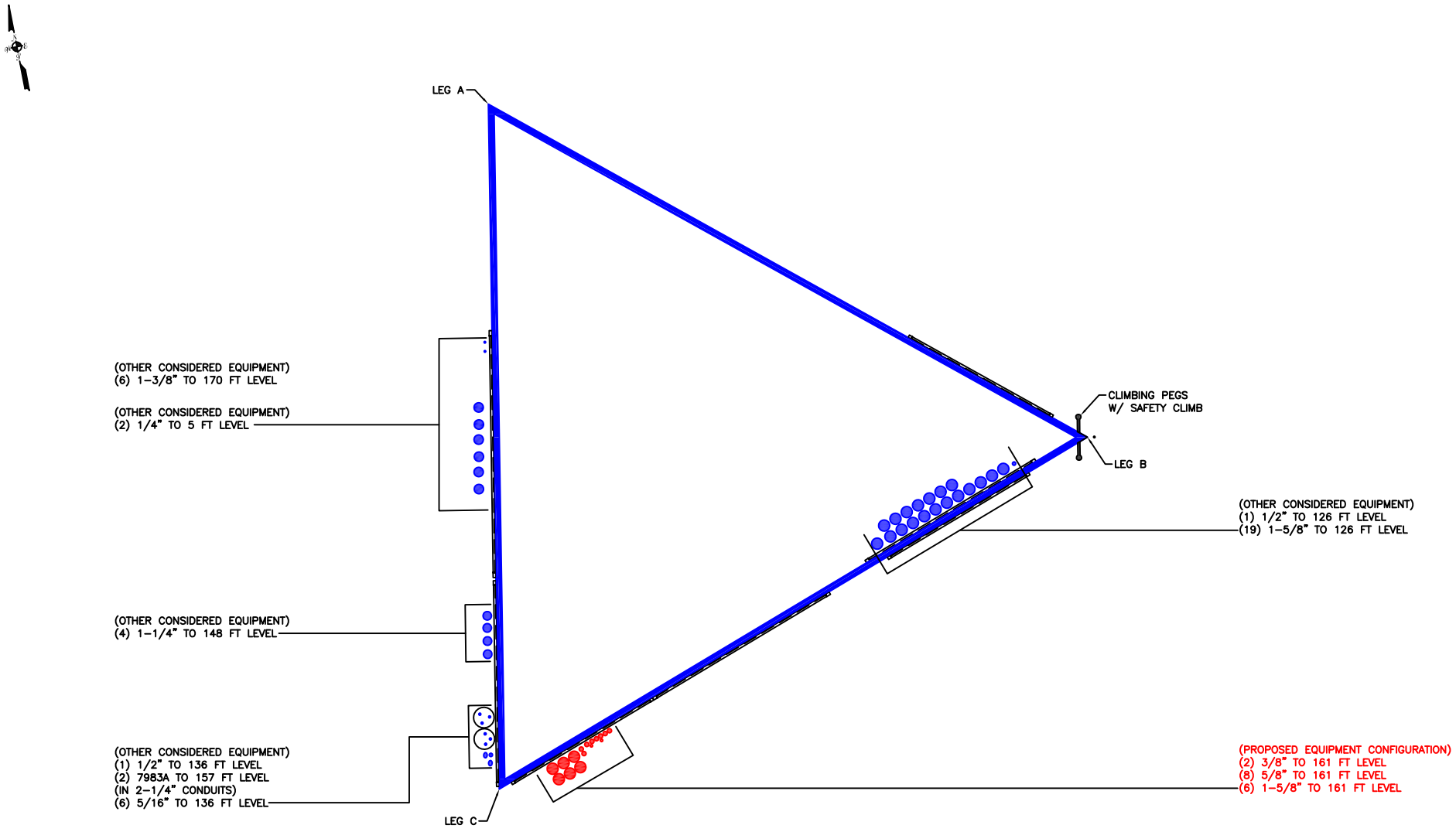
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-10.851	116.138	9.3	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-17.267	167.901	10.3	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-27.492	167.900	16.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-37.347	167.901	22.2	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-73.804	251.347	29.4	Pass
T6	120 - 100	Leg	ROHN 6 EHS	90	-114.785	288.515	39.8	Pass
T7	100 - 80	Leg	ROHN 6 EH	111	-151.860	318.903	47.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	126	-171.561	405.715	42.3	Pass
T9	70 - 60	Leg	ROHN 8 EHS	135	-191.739	405.715	47.3	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-231.942	405.717	57.2	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-272.078	530.833	51.3	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-312.291	530.833	58.8	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-2.439	10.104	24.1 29.2 (b)	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-4.393	19.793	22.2 35.4 (b)	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-4.684	17.900	26.2 37.1 (b)	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.411	16.240	33.3 44.4 (b)	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.376	12.489	59.1 61.9 (b)	Pass
T6	120 - 100	Diagonal	L3x3x1/4	94	-8.746	17.566	49.8 65.9 (b)	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	115	-9.853	18.890	52.2 66.8 (b)	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	130	-10.448	17.632	59.3 69.6 (b)	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	139	-11.254	27.539	40.9 52.2 (b)	Pass
T10	60 - 40	Diagonal	L4x4x1/4	148	-11.850	20.589	57.6 77.9 (b)	Pass
T11	40 - 20	Diagonal	L4x4x5/16	163	-12.580	21.559	58.4 66.0 (b)	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	178	-13.964	31.656	44.1 63.0 (b)	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.088	4.230	2.1	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	48	-0.411	4.069	10.1 12.0 (b)	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	59	0.391	17.663	2.2 6.6 (b)	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.545	3.097	17.6	Pass
						Summary		
						Leg (T12)	58.8	Pass
						Diagonal (T10)	77.9	Pass
						Top Girt (T3)	12.0	Pass
						Mid Girt (T1)	17.6	Pass
						Bolt Checks	77.9	Pass
						RATING =	**77.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


LEG A
(OTHER CONSIDERED EQUIPMENT)
(6) 1-3/8" TO 170 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/4" TO 5 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
LEG B
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 126 FT LEVEL
(19) 1-5/8" TO 126 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 148 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 136 FT LEVEL
(2) 7983A TO 157 FT LEVEL
(IN 2-1/4" CONDUITS)
(6) 5/16" TO 136 FT LEVEL
LEG C
(PROPOSED EQUIPMENT CONFIGURATION)
(2) 3/8" TO 161 FT LEVEL
(8) 5/8" TO 161 FT LEVEL
(6) 1-5/8" TO 161 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	807133
Site Name	BRG 134 943057
Order #	525047, Rev. 0

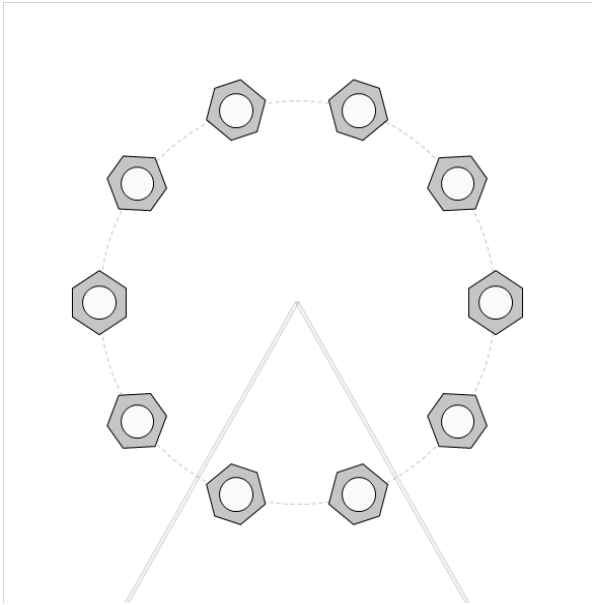
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	0.00	268.00
Shear Force (kips)	0.00	34.00

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(10) 1" ø bolts (A449 N; Fy=92 ksi, Fu=120 ksi)

l_{ar} *(in): 0*

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 26.8	ϕPn_t = 54.54	**Stress Rating**
Vu = 3.4	ϕVn = 35.34	**23.9%**
Mu = n/a	ϕMn = n/a	**Pass**

Foundation Analysis - Rock Anchors

Applied Loads:

$U := 268kip$ — Uplift Force per Leg

$C := 322kip$ — Compression Force per Leg

$d_{pier} := 9ft$ $b_{pier} := 6.25ft$ — Pier Dimensions

$L_{pier} := 9ft$ — Pier Length

$n := 4$ — Number of Anchors

$W_{conc} := \gamma_c \cdot L_{pier} \cdot d_{pier} \cdot b_{pier} = 75.94 \cdot kip$ — Pier Weight

$R_u := U - 0.9 \cdot W_{conc} = 199.66 \cdot kip$ — Applied Uplift Force

$R_c := C + 1.2 \cdot W_{conc} = 413.13 \cdot kip$ — Applied Compression Force

Compression Analysis:

$q_{ult} := 30ksf$ — Ultimate Bearing Capacity

$\phi := 0.75$ — Bearing Strength Reduction Factor

$A_{bearing} := d_{pier} \cdot b_{pier} = 56.25\ ft^2$ — Bearing Area

$R_{n_bearing} := q_{ult} \cdot A_{bearing} = 1687.5 \cdot kip$ — Nominal Bearing Capacity

$\phi R_{n_bearing} := \phi \cdot R_{n_bearing} = 1265.63 \cdot kip$ — Bearing Capacity

$R_c = 413.13 \cdot kip$ — Applied Compression Force

$$Compression := \frac{R_c}{\phi R_{n_bearing}} = 32.64 \cdot \%$$ — Bearing Stress Rating

Lateral Analysis:

$\mu := 0.3$ — Sliding Friction Factor

$\phi := 0.75$ — Sliding Strength Reduction Factor

$R_v := 44kip$ — Compression Shear per Leg

$R_c = 413.13 \cdot kip$ — Applied Compression Force per Leg

$R_s := R_c \cdot \mu = 123.94 \cdot kip$ — Nominal Lateral Resistance

$\phi R_s := \phi \cdot R_s = 92.95 \cdot kip$ — Lateral Resistance

$$Lateral := \frac{R_v}{\phi R_s} = 47.34 \cdot \%$$ — Lateral Stress Rating

Uplift Analysis:

8.1.a Steel Anchor Nominal Tensile Strength:

$F_u := 90ksi$ — A615 Gr. 60 Rebar

$A_{net} := 1.56in^2$ — #11 Rebar

$R_u = 199.66 \cdot kip$ — Uplift Force per Leg

$R_{n_steel} := F_u \cdot A_{net} = 140.4 \cdot kip$ — Nominal Steel Anchor Strength per Anchor

8.1.b Steel-to-Grout Nominal Bonding Strength:

$L := 8.5ft$ — Embedded Length

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$f_c := 4000psi$ — Grout Compressive Strength (Assumed)

$A_s := \pi \cdot d_{hole} \cdot \left(\frac{L}{\cos(\theta)}\right) = 721 \cdot in^2$ — Rebar Surface Area

$F_{s_g} := 6 \cdot \sqrt{f_c} \cdot \sqrt{psi} = 379.47 \cdot psi$ — Steel-to-Grout Bond Strength

$R_{n_steel_to_grout} := A_s \cdot F_{s_g} = 273.6 \cdot kip$ — Nominal Steel-to-Grout Bond Strength per Anchor

8.1.c Grout-Rock Nominal Bonding Strength:

$L_{rock} := 8.5ft$ — Length of Embedment Into Rock Layer

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$F_{r_g} := 110psi$ — Grout-Rock Bond Strength

$A_b := \pi \cdot d_{hole} \cdot \left(\frac{L_{rock}}{\cos(\theta)}\right) = 721 \cdot in^2$ — Grout Surface Area

$R_{n_rock_grout} := F_{r_g} \cdot A_b = 79.31 \cdot kip$ — Nominal Grout-Rock Bond Strength per Anchor

8.1.d Nominal Weight of Rock Prism

$L_{eff} := 11.25\,ft$ — Effective Embedment Length Into Rock

$d_{anchors} := 2.083\,ft$ — Diameter of Anchor Group @ Effective Embedment (Assumed)

$\phi_{rock} := 40°$ — Interal Friction Angle of Rock

$\gamma_{rock} := 140\,pcf$ — Unit Weight of Rock

$h_{soil} := 20\,ft$ — Soil Layer Height

$\phi_{soil} := 40°$ — Internal Friction Angle of Soil

$\gamma_{soil} := 135\,pcf$ — Unit Weight of Soil

$d_1 := d_{anchors} = 2.083\ ft$ — Diameter of Anchor Group @ Effective Embedment

$d_2 := 2 \cdot L_{eff} \cdot \tan(\phi_{rock}) + d_{anchors} = 20.96\ ft$ — Diameter @ Top of Rock Layer

$d_3 := d_2 + 2 \cdot h_{soil} \cdot \tan(\phi_{soil}) = 54.53\ ft$ — Diameter @ Top of Soil Layer

$$V_{rock} := \frac{\pi \cdot L_{eff}}{3} \cdot \left[\left(\frac{d_2}{2}\right)^2 + \left(\frac{d_2}{2}\right)\left(\frac{d_1}{2}\right) + \left(\frac{d_1}{2}\right)^2\right] = 1435.63 \cdot ft^3$$

$$V_{soil} := \frac{\pi \cdot h_{soil}}{3} \cdot \left[\left(\frac{d_3}{2}\right)^2 + \left(\frac{d_3}{2}\right)\left(\frac{d_2}{2}\right) + \left(\frac{d_2}{2}\right)^2\right] = 23853.22 \cdot ft^3$$

$W_{rock} := \gamma_{rock} \cdot V_{rock} = 200.99 \cdot kip$ — Weight of Rock Cone

$W_{soil} := \gamma_{soil} \cdot V_{soil} = 3220.19 \cdot kip$ — Weight of Soil Cone

$R_{n_rock} := W_{rock} + W_{soil} = 3421.17 \cdot kip$ — Total Rock & Soil Prism Weight

$R_n := \min(R_{n_steel}, R_{n_steel_to_grout}, R_{n_rock_grout}, R_{n_rock}) = 79.31 \cdot kip$

$\phi R_n := \phi \cdot R_n = 59.48 \cdot kip$

$P_u := \frac{R_u}{n} = 49.91 \cdot kip$

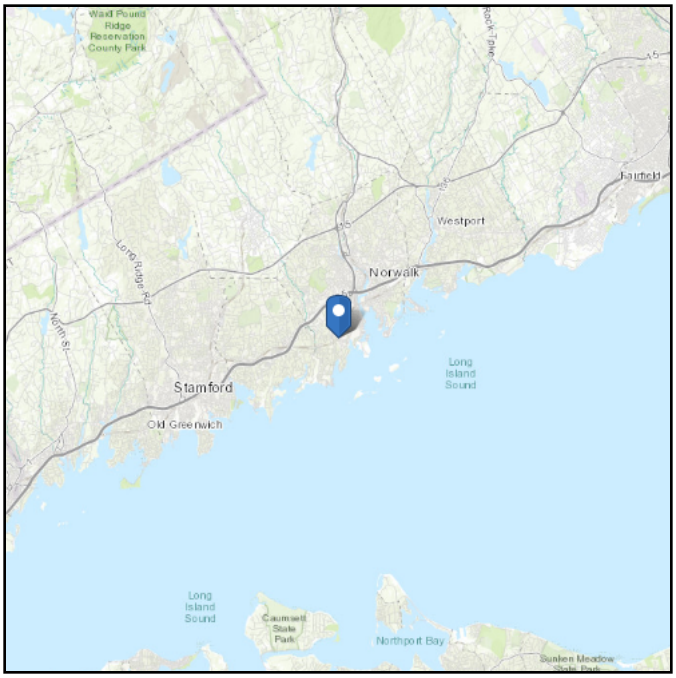
$Uplift := \frac{P_u}{\phi R_n} = 83.91 \cdot \%$

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 60.78 ft (NAVD 88)
Latitude: 41.081789
Longitude: -73.430422



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	98 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Mon Aug 03 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

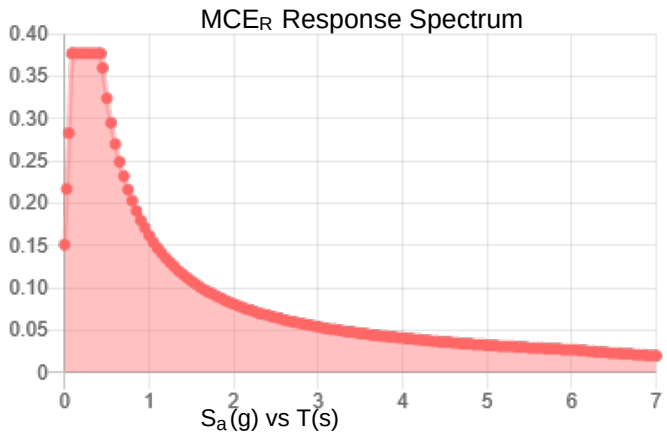
Seismic

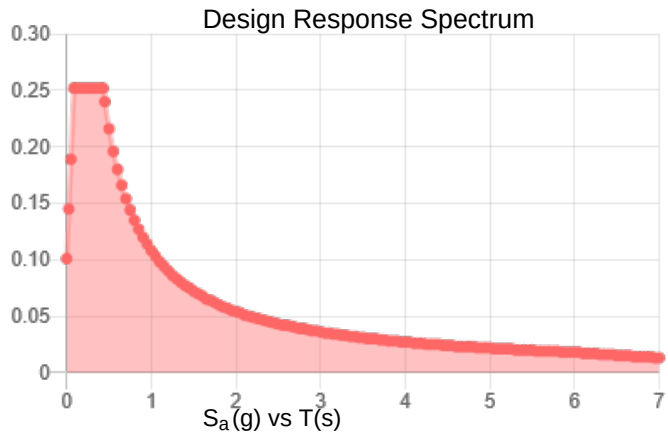
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.236	S_{DS} :	0.252
S_1 :	0.068	S_{D1} :	0.108
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.134
S_{MS} :	0.377	PGA_M :	0.206
S_{M1} :	0.162	F_{PGA} :	1.531
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Aug 03 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Aug 03 2020

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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

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MOUNT ANALYSIS REPORT

Prepared for: Smartlink / AT&T

Site No.:	CTL02122
FA#:	10035123
Site Location:	50 ROCKLAND ROAD NORWALK, CT 06854
Rad Center:	160 ft
Proposed Stress Ratio:	54.2 %
Result:	Pass

June 8, 2020

Barbara T. Kotecki, P.E.

FULLERTON
ENGINEERING · DESIGN

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www.fullertonengineering.com

Project Number: 2020.0032.0029

REPORT INDEX

Project Summary .....

RISA Model Rendering .....

Loading Information .....

Calculations .....

RFDS .....

Mount Analysis Checklist .....

Summary

This structural assessment is in regards to the adequacy of the existing sector frames with (1) stiff-arm per sector for the AT&T LTE 6C project. The purpose was to determine conformance of the existing antenna mounting structure under the 2018 Connecticut State Building Code and the industry standard ANSI/TIA-222-H (Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures).

Based on collected information via site visit photos dated 05/10/2020, existing and proposed loading presented in the RFDS provided by AT&T dated 03/27/2020 Ver. 1.00, Construction Drawings by Fullerton Engineering dated 06/06/2018, Mount Analysis Report by Fullerton Engineering dated 11/27/2017, technical data of the proposed equipment, structural calculations and engineering judgment, the existing sector frames with (1) stiff-arm per sector are **adequate** to support the proposed installation for the above-referenced program, **with a maximum stress ratio of 54.2%.**

Final Configuration Loading:

CARRIER	RAD CENTER (FT)	QTY.	MANUFACTURER	MODEL	AZMIMUTH	POSITION
AT&T	160'-0"	2	CCI	HPA-65R-BUU-H6	30°,150°	A1,B1
		2	CCI	OPA65R-BU6DA	30°,150°	A2,B2
		2	Quintel	QS66512-2	30°,150°	A3,B3
		1	Andrew	SBNHH-1D65A	270°	C1
		1	CCI	OPA65R-BU4DA	270°	C2
		1	CCI	QS46512-2	270°	C3
		3	Ericsson	4426 B66	N/A	A1,B1,C1
		3	Ericsson	4478 B14	N/A	A2,B2,C2
		3	Ericsson	RRUS-11 B12	N/A	A3,B3,C3
		3	Ericsson	4478 B5	N/A	A3,B3,C3
		3	Ericsson	RRUS-32 B2	N/A	A3,B3,C3
		3	Ericsson	RRUS-32 B30	N/A	A3,B3,C3
		2	Raycap	DC6-48-60-18-8F	N/A	Mounted to sector frame
		2	Raycap	DC6-48-60-0-8F	N/A	

Member Component Capacity Table:

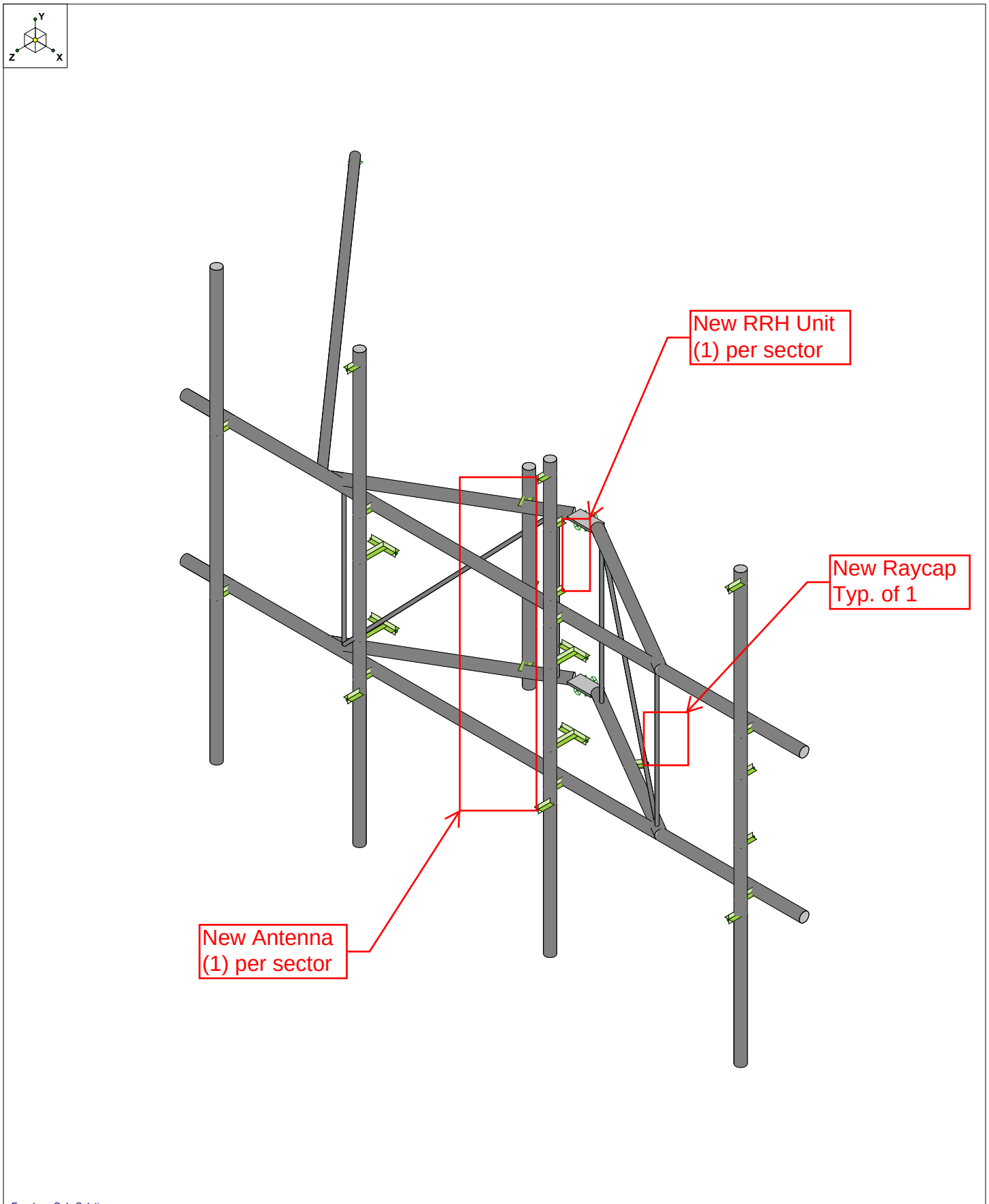
Component	% Capacity	Pass / Fail
Face Horizontals	54.2 %	**Pass**
Standoff Members	27.1 %	**Pass**
Tie-Back	16.5 %	**Pass**
Mounting Pipes	47.7 %	**Pass**
Mount-to-Tower Connection, Threaded Rods	14.18 %	**Pass**

Structural Rating (max from all components) =	**54.2 %**

Summary

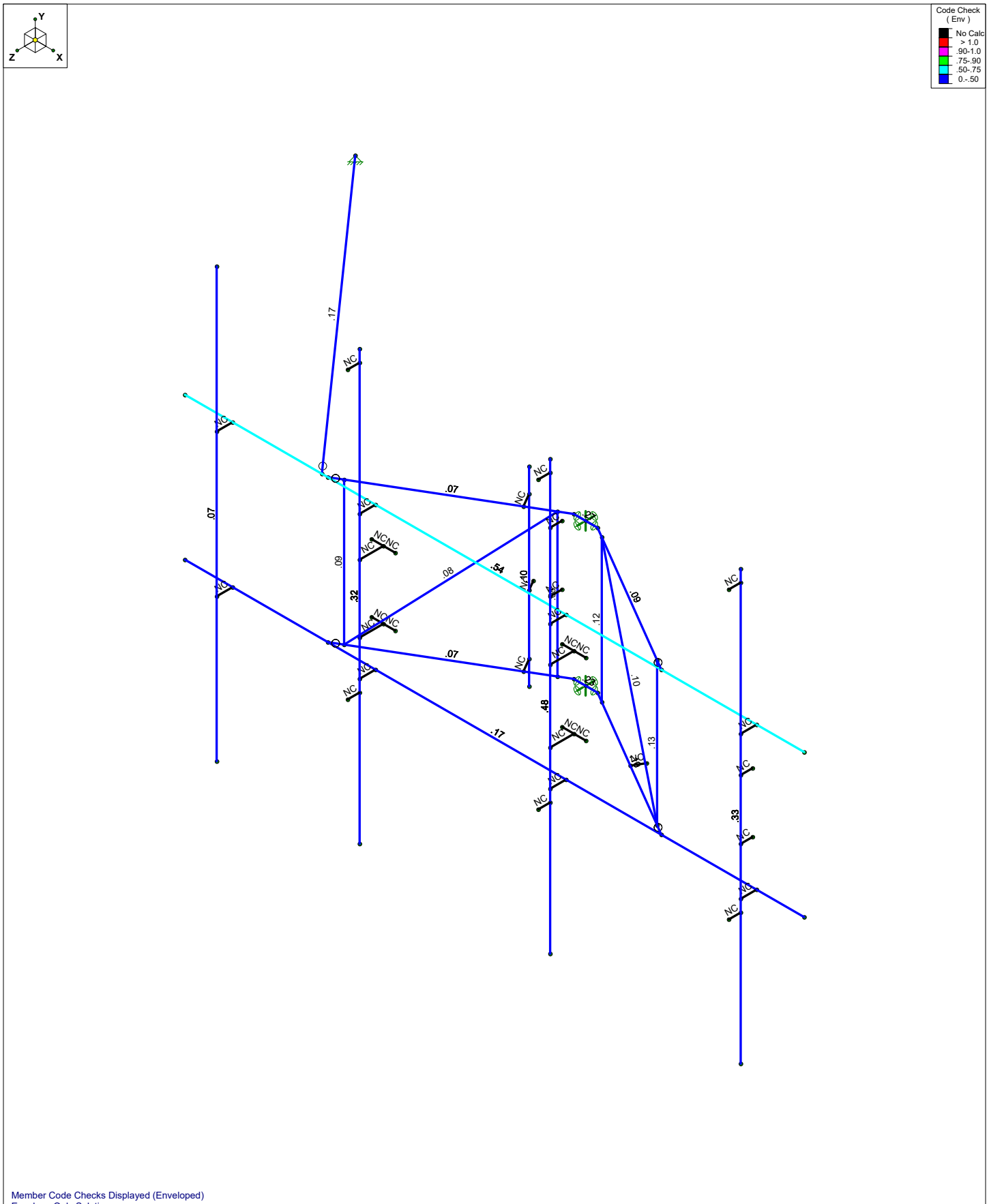
This PE certification completed by Fullerton Engineering, P.C. is inclusive of the existing antenna mounting structure that will support the existing and proposed loading provided by the client.

This certification assumes that all the structural members of the existing antenna mounting structure are in good condition and have not been altered from the manufacturer's original design. Prior to installation of new equipment, contractor shall inspect the condition of all relevant members and connectors. The contractor shall be responsible for the means and methods of construction.



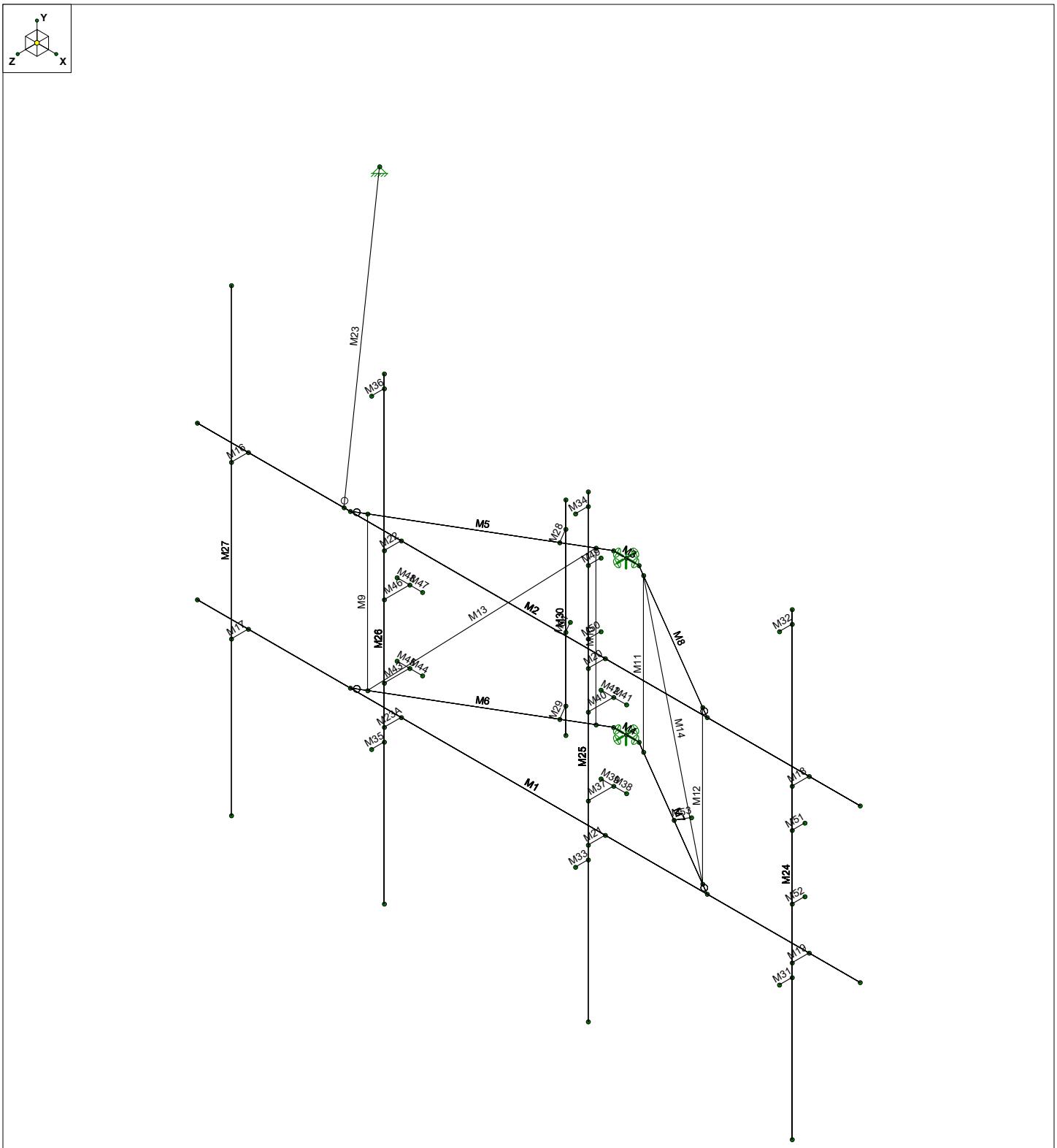
Envelope Only Solution

Fullerton Engineering Con...		SK - 1
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	3D Render	CTL02122 - Mount Analysis.r3d



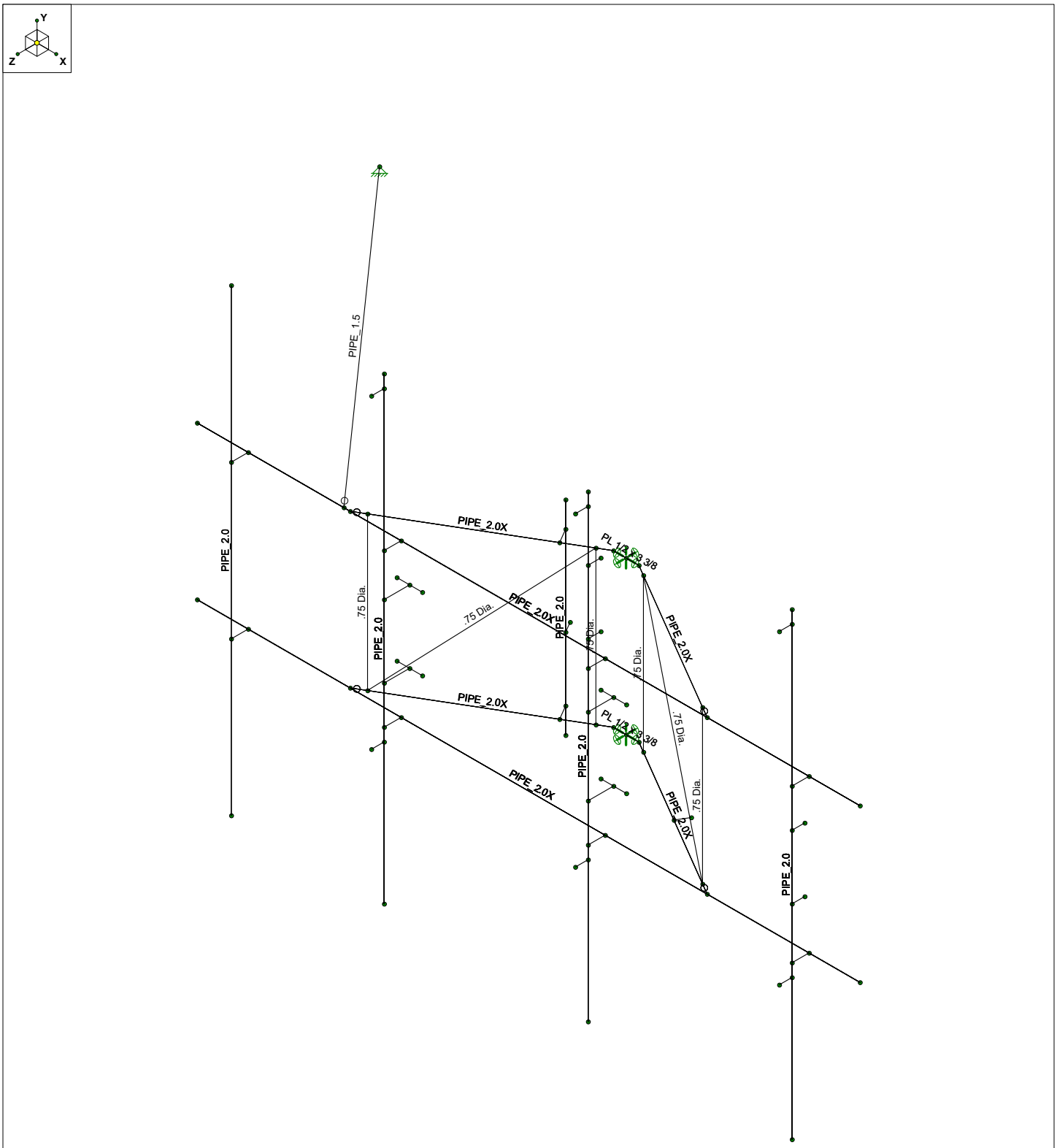
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Fullerton Engineering Con...		SK - 2
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	Unity Graphic	CTL02122 - Mount Analysis.r3d



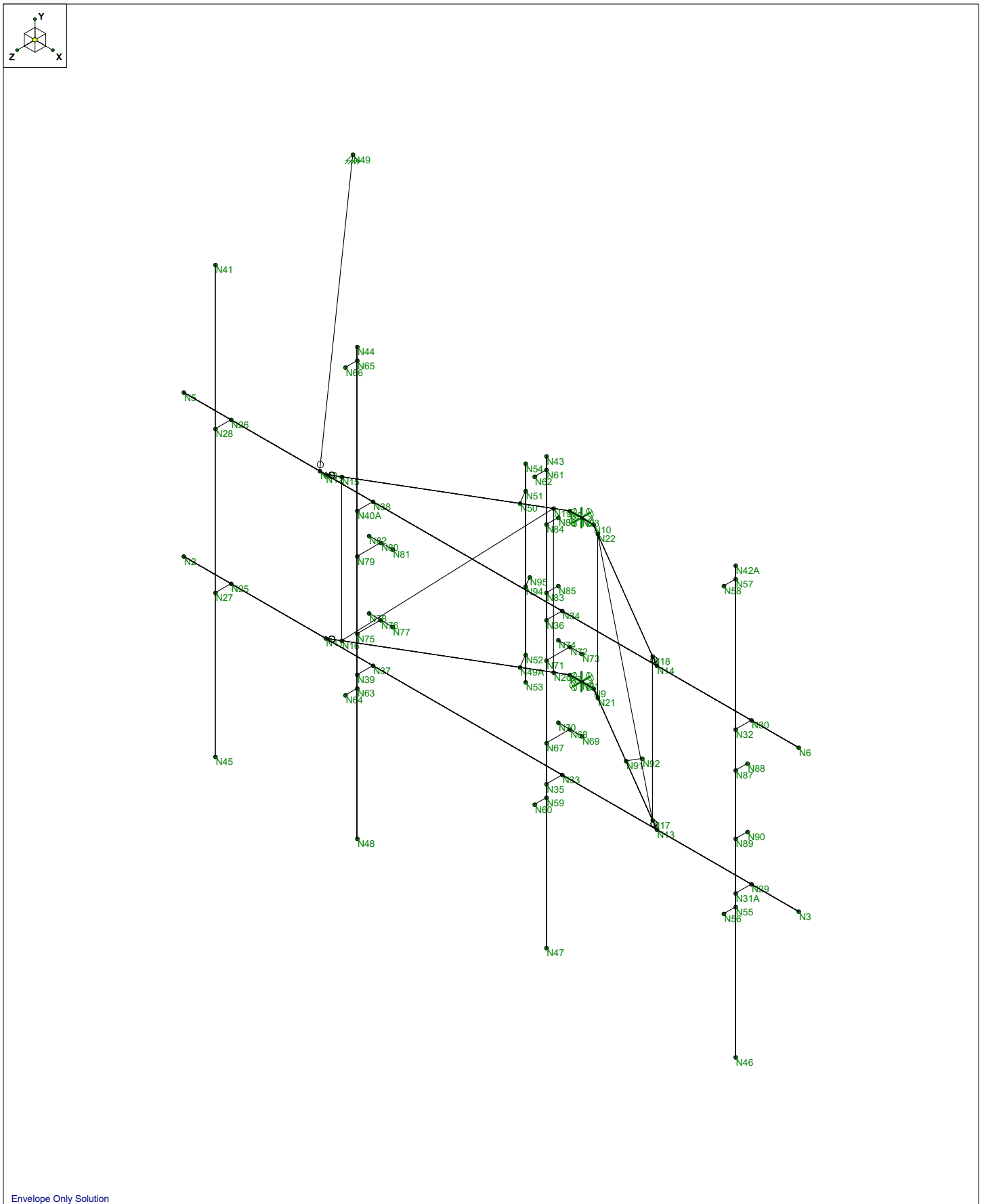
Envelope Only Solution

Fullerton Engineering Con...		SK - 3
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	Member Label	CTL02122 - Mount Analysis.r3d



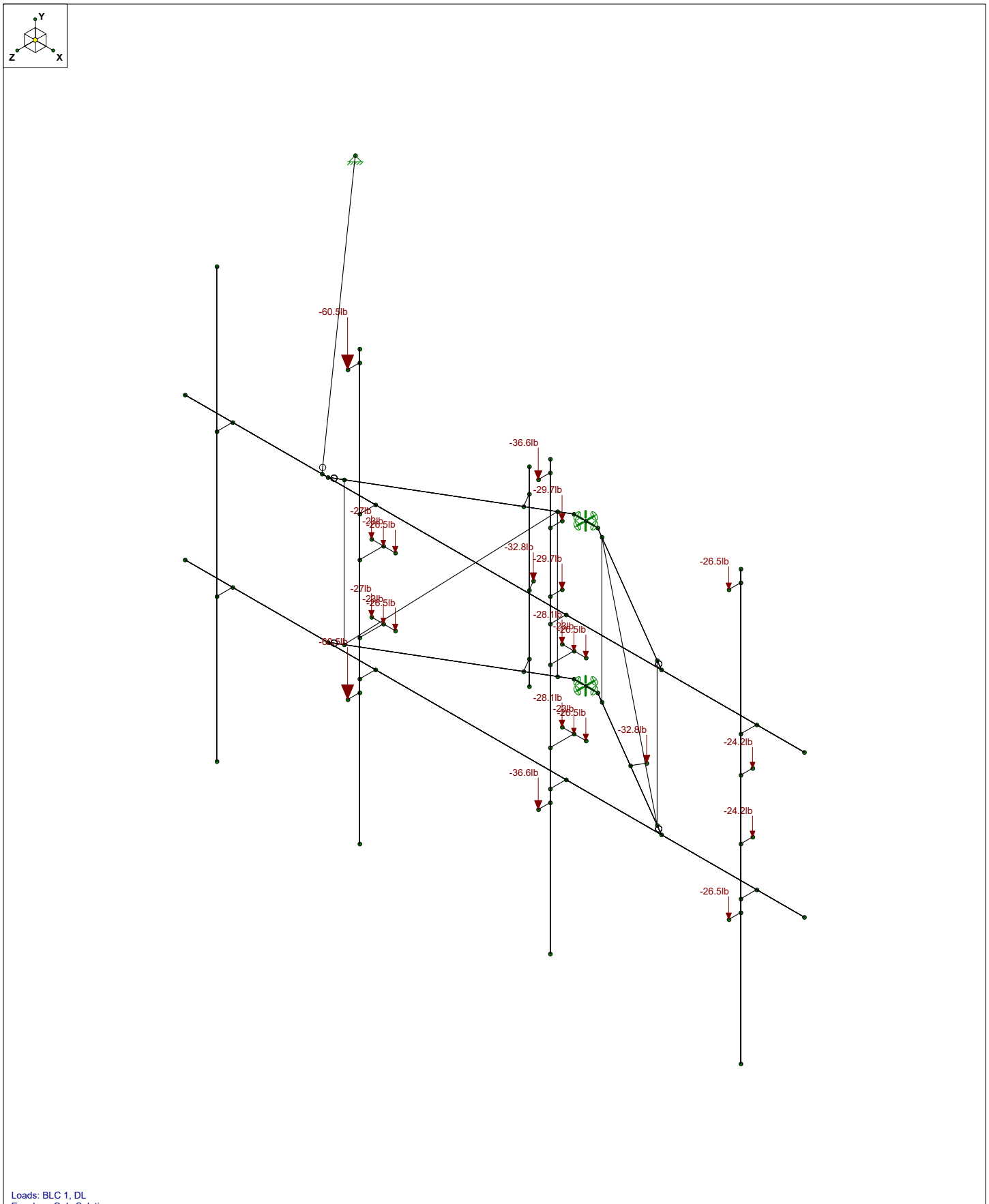
Envelope Only Solution

Fullerton Engineering Con...		SK - 4
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	Shape	CTL02122 - Mount Analysis.r3d



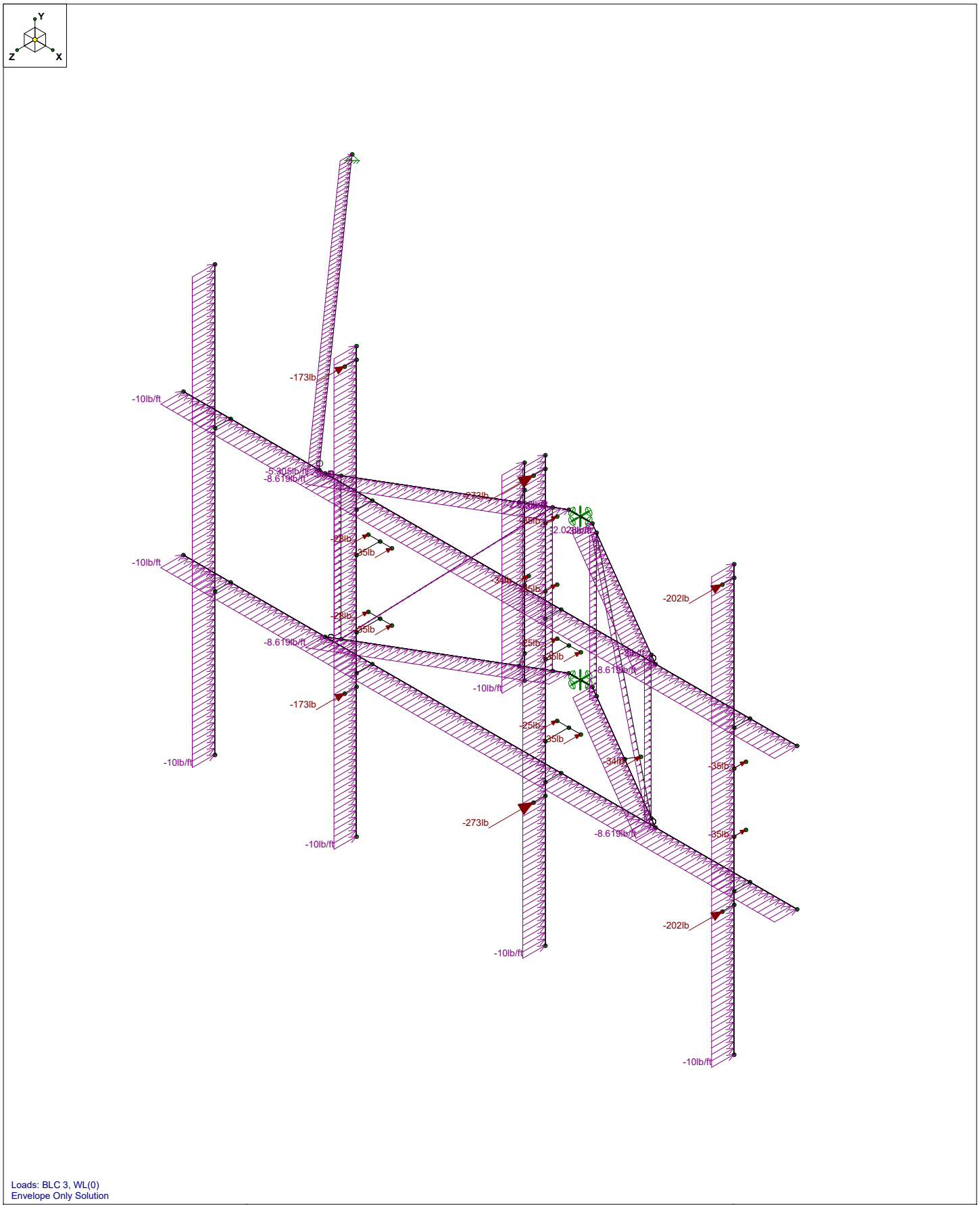
Envelope Only Solution

Fullerton Engineering Con...		SK - 5
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	Nodes	CTL02122 - Mount Analysis.r3d



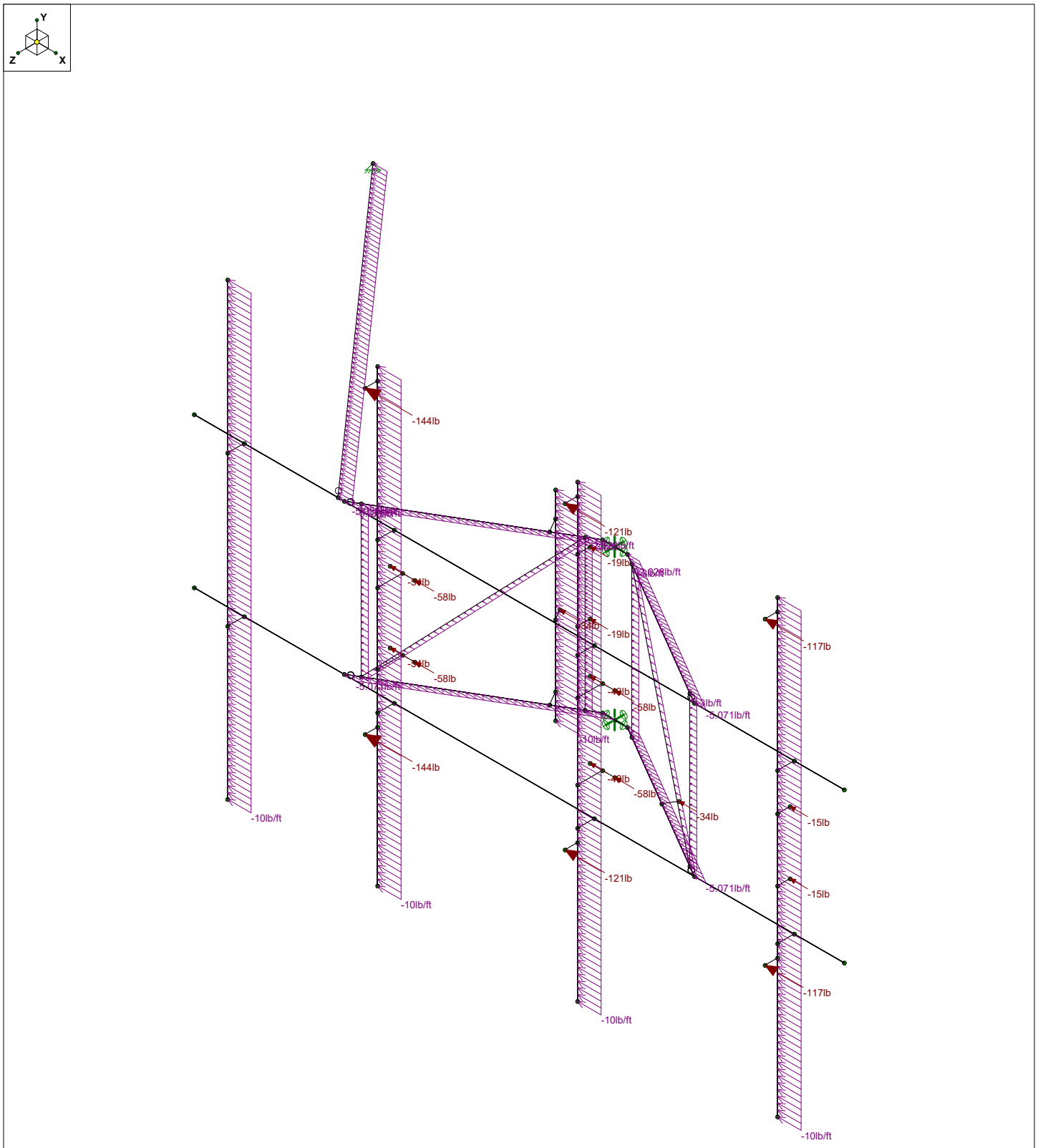
Loads: BLC 1, DL
Envelope Only Solution

Fullerton Engineering Con...		SK - 6
LA	Mount Analysis	June 8, 2020 at 3:17 PM
CTL02122	Dead Load	CTL02122 - Mount Analysis.r3d



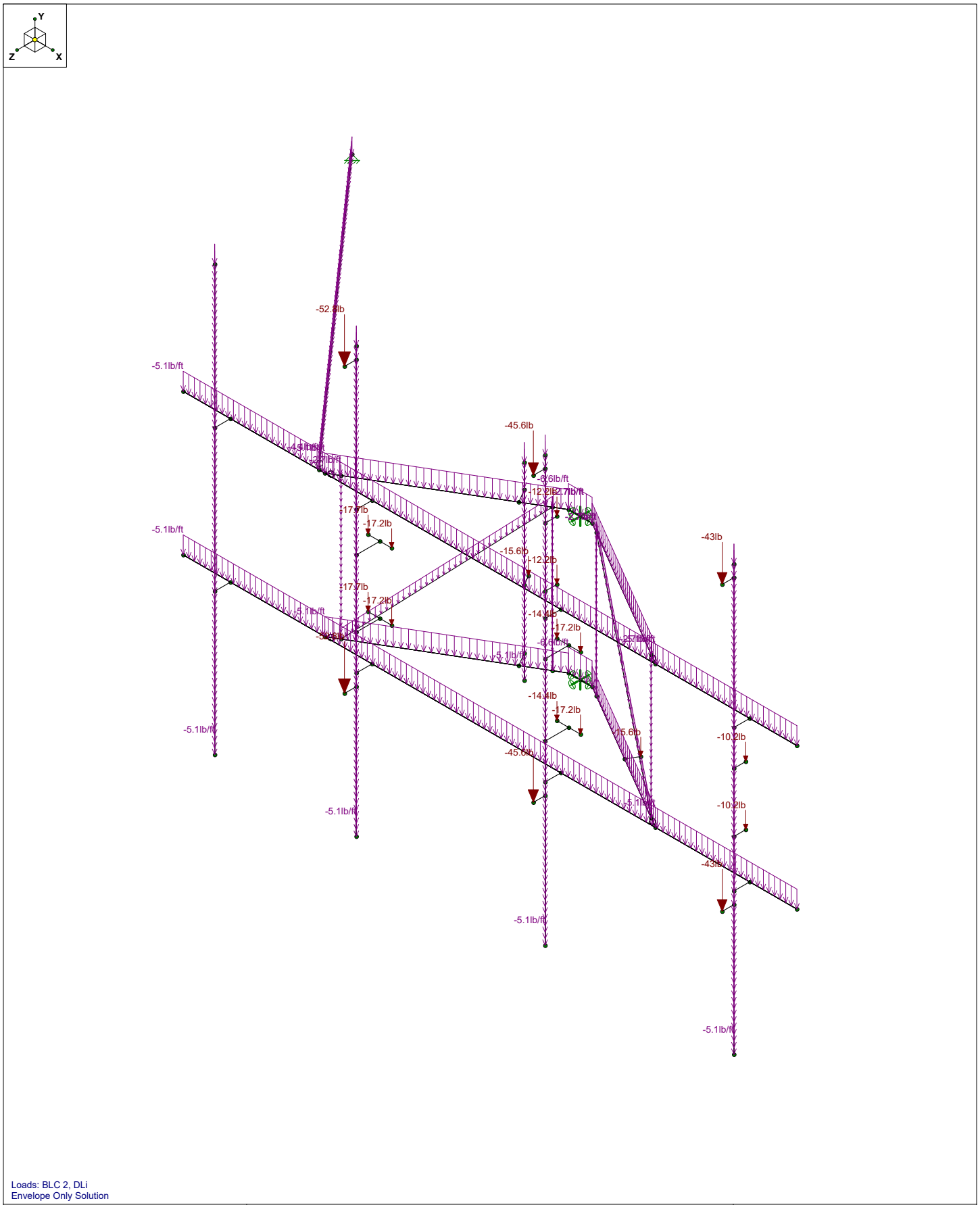
Loads: BLC 3, WL(0)
Envelope Only Solution

Fullerton Engineering Con...		SK - 7
LA	Mount Analysis	June 8, 2020 at 3:18 PM
CTL02122	Wind Load (Z-Direction)	CTL02122 - Mount Analysis.r3d



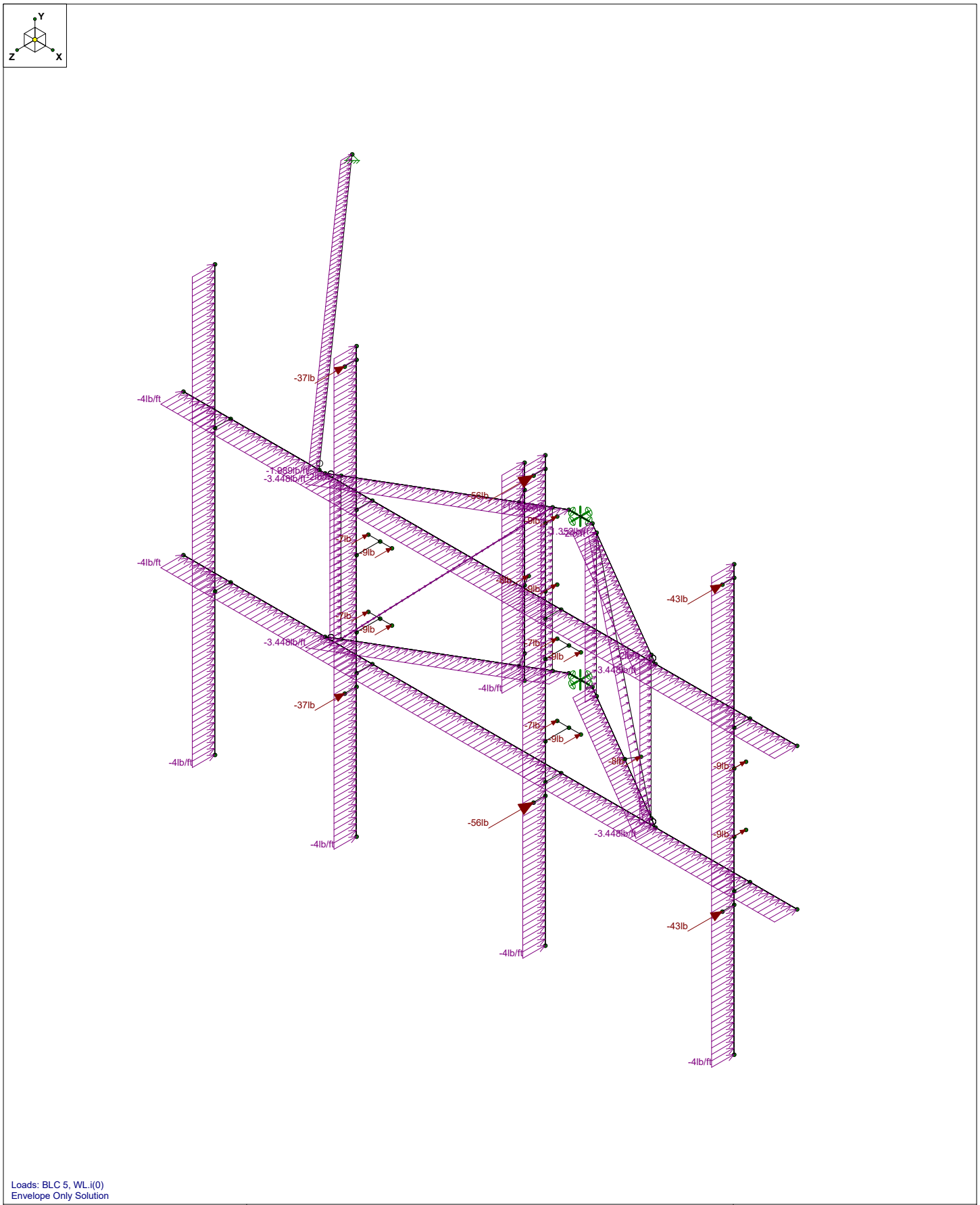
Loads: BLC 4, WL(90)
Envelope Only Solution

Fullerton Engineering Con...		SK - 8
LA	Mount Analysis	June 8, 2020 at 3:18 PM
CTL02122	Wind Load (X-Direction)	CTL02122 - Mount Analysis.r3d



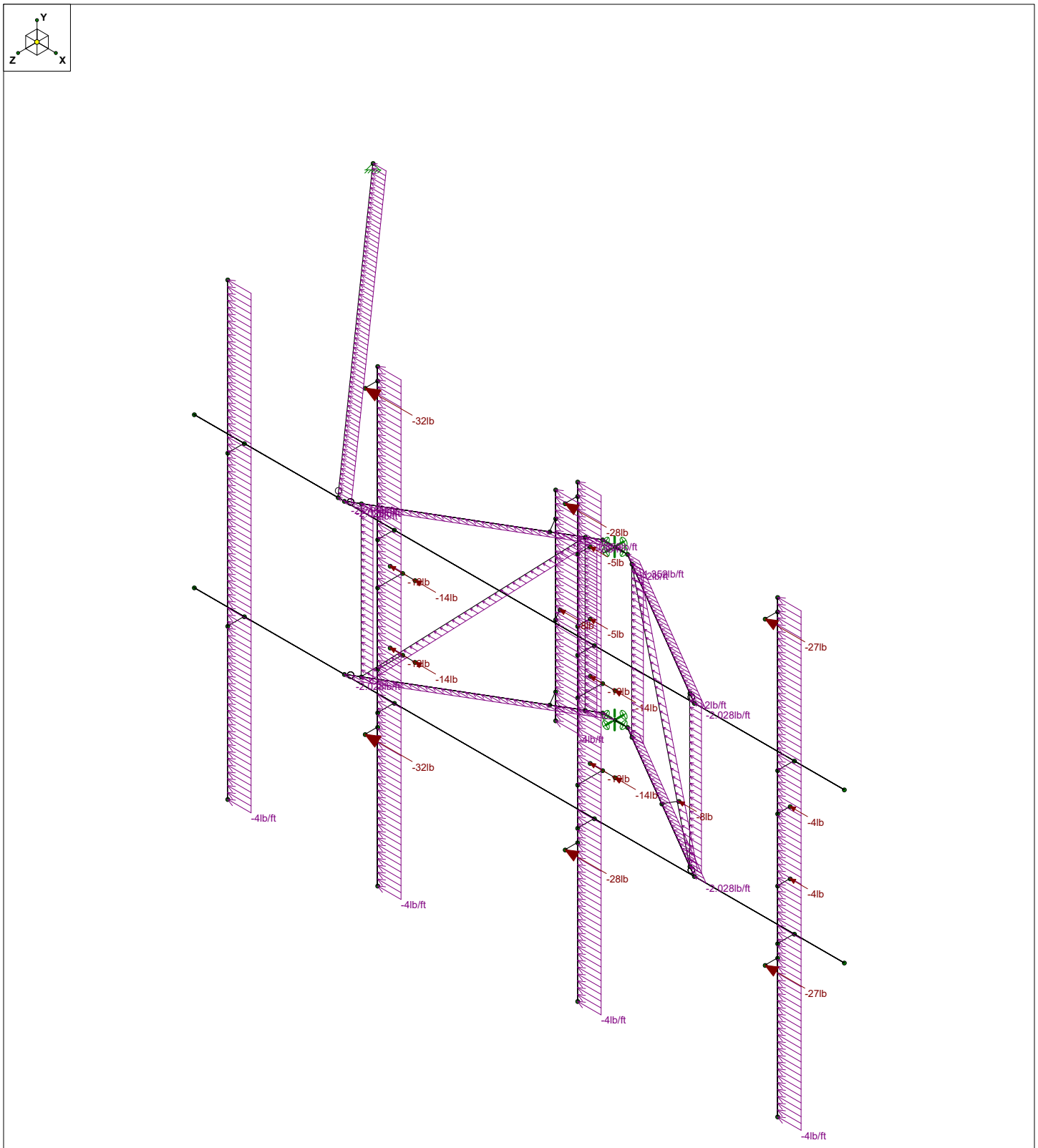
Loads: BLC 2, DLi
Envelope Only Solution

Fullerton Engineering Con...		SK - 9
LA	Mount Analysis	June 8, 2020 at 3:18 PM
CTL02122	Ice Load	CTL02122 - Mount Analysis.r3d



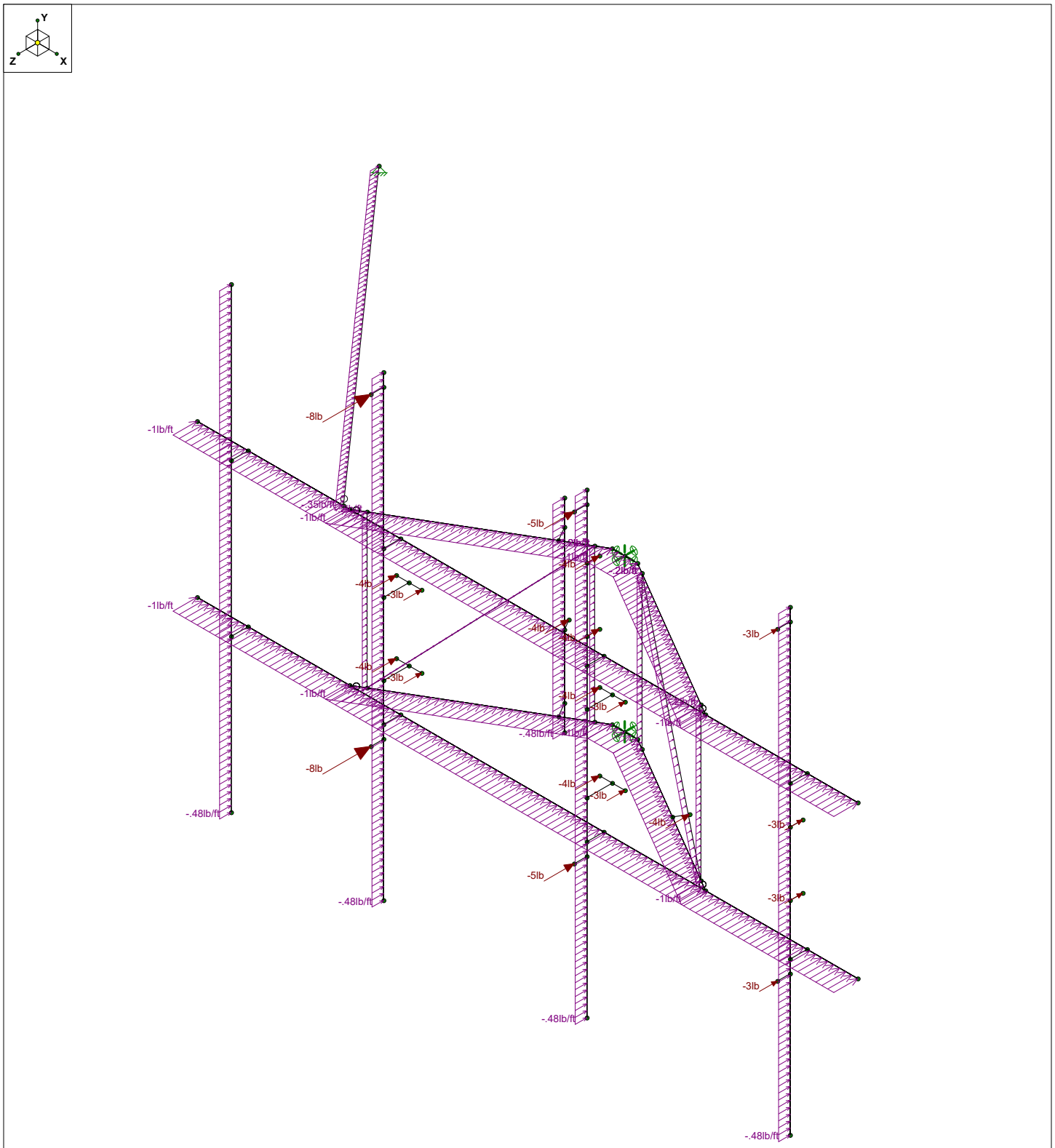
Loads: BLC 5, WL.i(0)
Envelope Only Solution

Fullerton Engineering Con...		SK - 10
LA	Mount Analysis	June 8, 2020 at 3:18 PM
CTL02122	Wind Load with Ice (Z-Direction)	CTL02122 - Mount Analysis.r3d



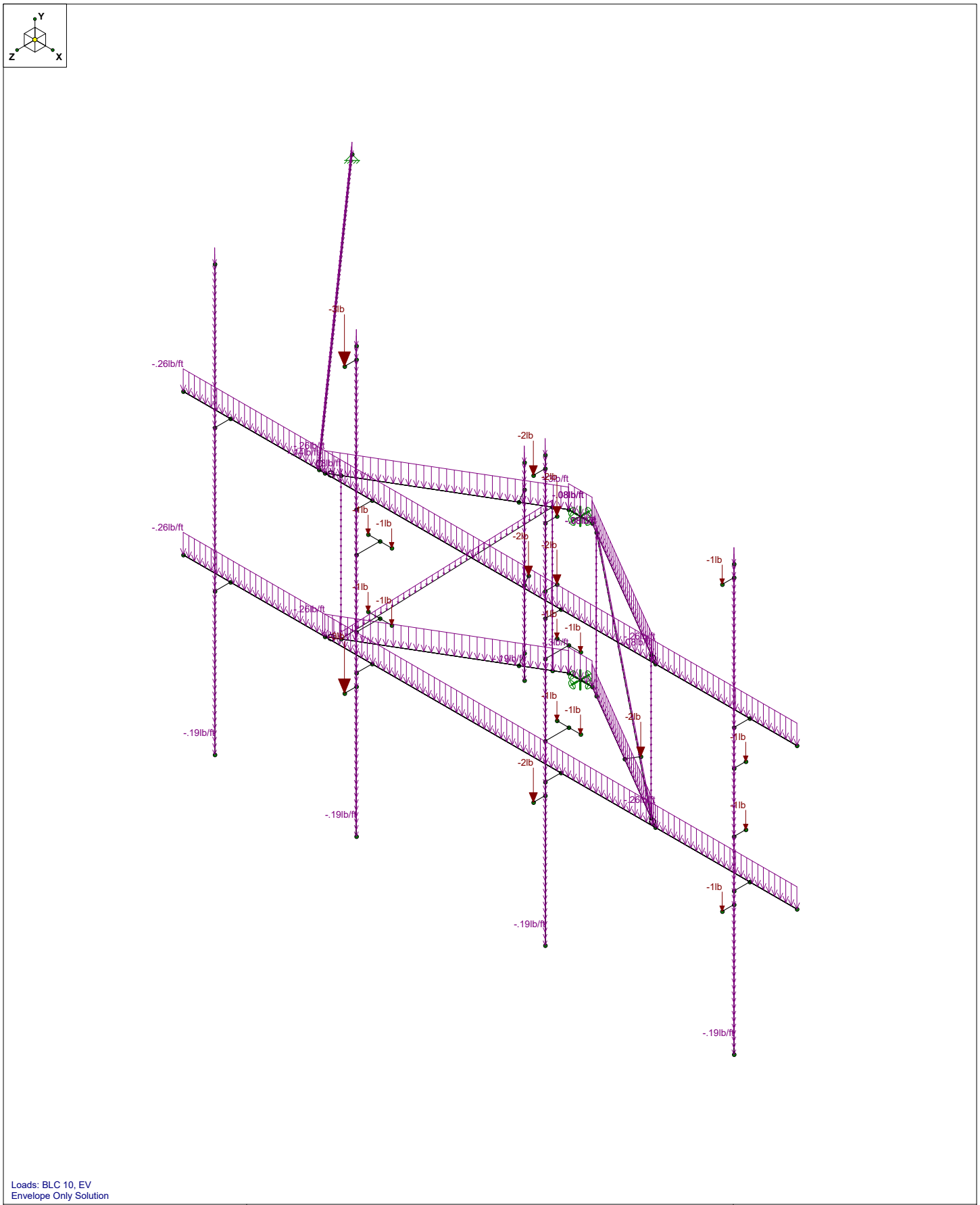
Loads: BLC 6, WL.i(90)
Envelope Only Solution

Fullerton Engineering Con...		SK - 11
LA	Mount Analysis	June 8, 2020 at 3:19 PM
CTL02122	Wind Load with Ice (X-Direction)	CTL02122 - Mount Analysis.r3d



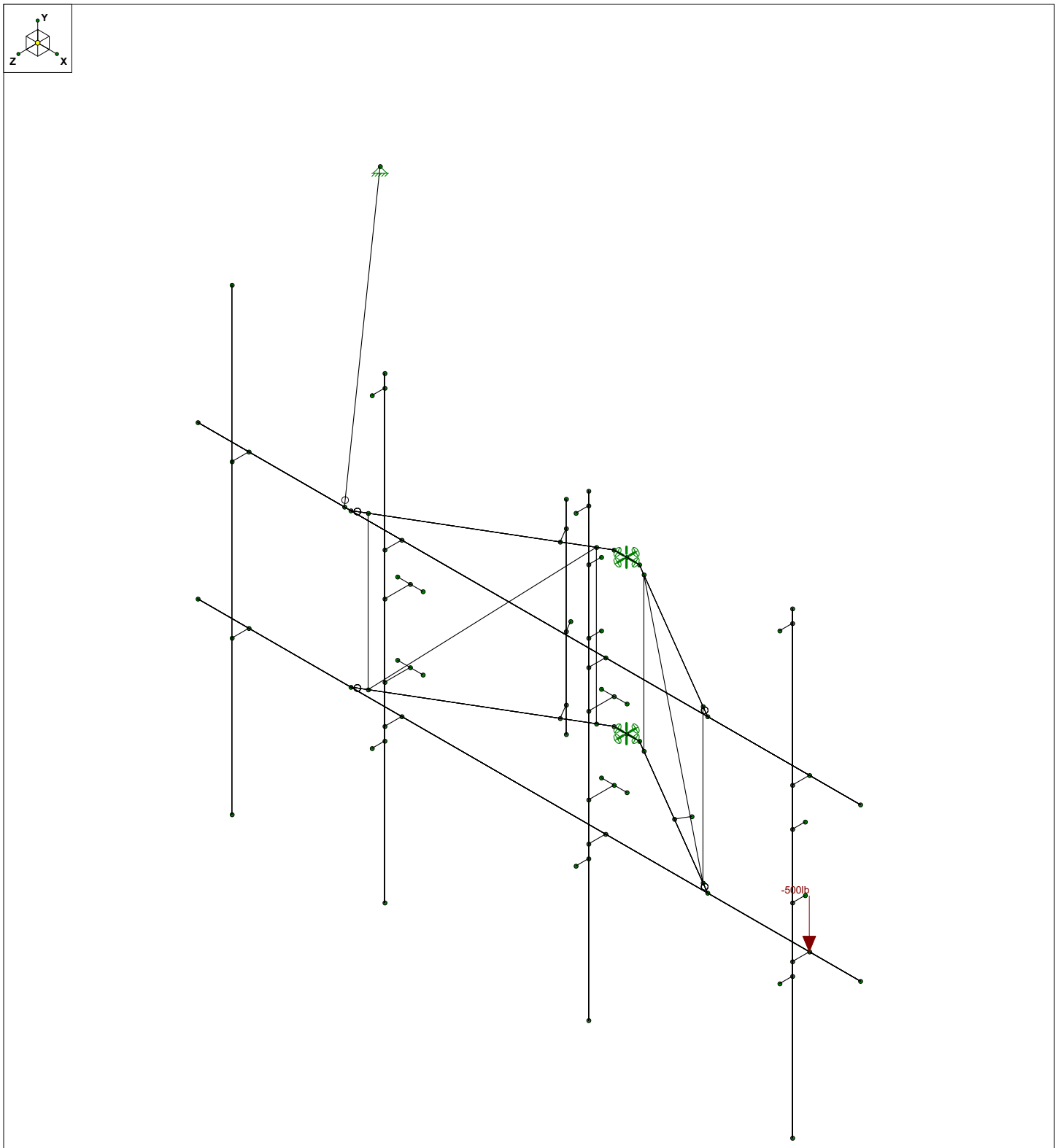
Loads: BLC 8, EH(0)
Envelope Only Solution

Fullerton Engineering Con...		SK - 12
LA	Mount Analysis	June 8, 2020 at 3:19 PM
CTL02122	Earthquake Load (Horizontal)	CTL02122 - Mount Analysis.r3d



Loads: BLC 10, EV
Envelope Only Solution

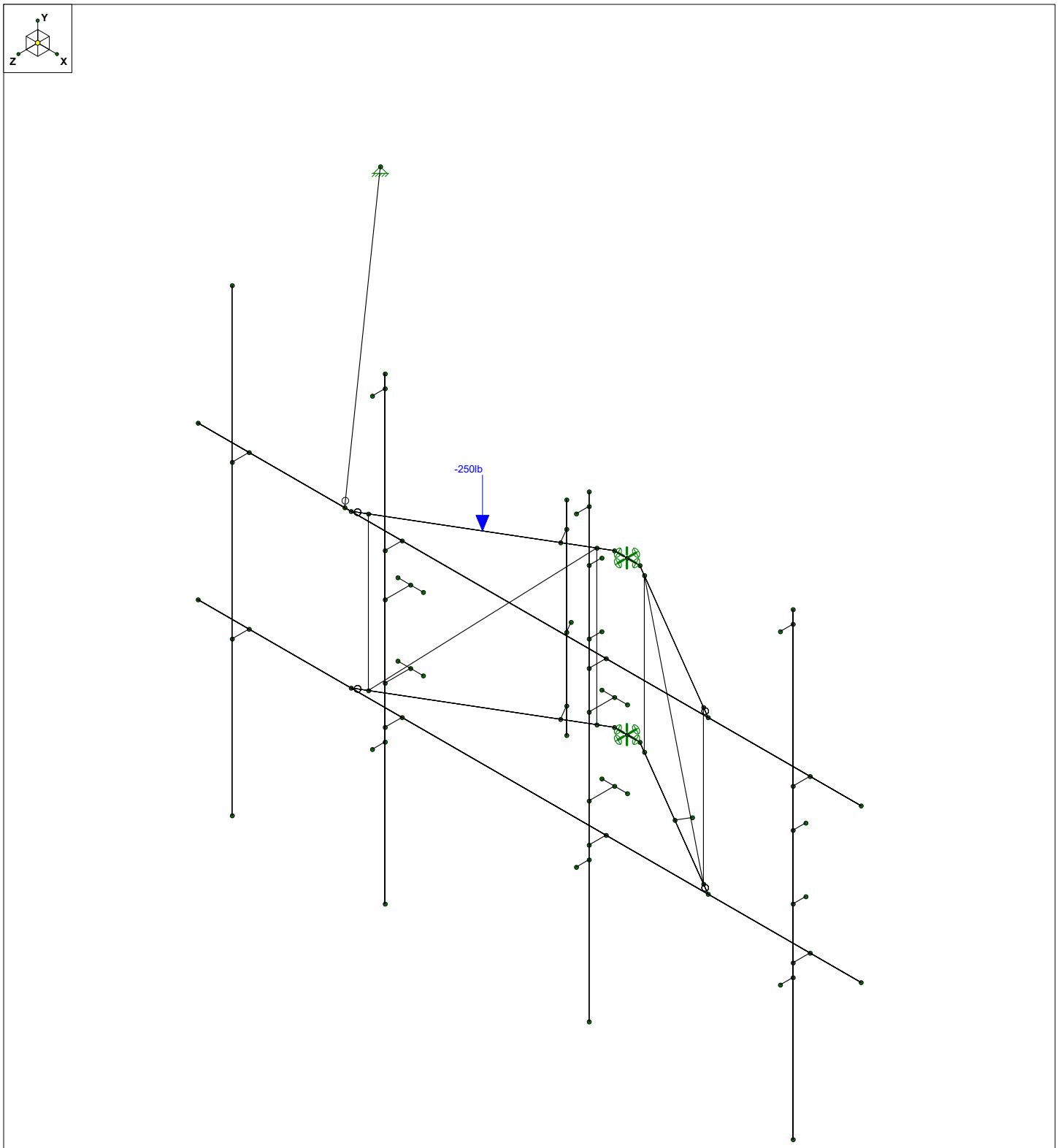
Fullerton Engineering Con...		SK - 13
LA	Mount Analysis	June 8, 2020 at 3:19 PM
CTL02122	Earthquake Load (Vertical)	CTL02122 - Mount Analysis.r3d



500lb Live Loads are applied at mounting pipe positions.
Only one is shown for clarification purposes, but all are considered in the calculations.

Loads: BLC 13, LM1
Envelope Only Solution

Fullerton Engineering Con...		SK - 14
LA	Mount Analysis	June 8, 2020 at 3:20 PM
CTL02122	500 lb Live Load	CTL02122 - Mount Analysis.r3d



250lb Live Loads are applied on each face horizontal and standoff members.
Only one is shown for clarification purposes, but all are considered in the calculations.

Loads: BLC 16, LV1
Envelope Only Solution

Fullerton Engineering Con...		SK - 15
LA	Mount Analysis	June 8, 2020 at 3:20 PM
CTL02122	250 lb Live Load	CTL02122 - Mount Analysis.r3d

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Site Number: **CTL02122**
Site Name: NORWALK ROCKLAND RD
Created By: LA
Checked By: BTK
Date: 6/8/2020
Code: ANSI/TIA-222-H

Base Structure Type	**Type**	Self Support Tower	
Structure Height Above Grade (ft)	**Ht**	180.00	
RAD Center (ft)	**z**	160.00	
Windspeed no ice (mph, 3-sec gust)	**V**	118.00	see wind maps
Windspeed with ice (mph, 3-sec gust)	**Vi**	50.00	see ice maps
Windspeed for maintenance (mph, 3-sec gust)	**Vm**	30.00	Section 16.6
Ice Thickness	**ti**	1.00	see ice maps
Exposure Category (B/C/D)	**Exposure**	C	Section 2.6.5.1.2
Topographic Category (1,2,3,4)	**Topo**	1.00	Section 2.6.6.1
Risk Category (I,II,III, IV)	**Cat**	II	Table 2-1
Crest Height	**H**	0.00	Section 2.6.6.2.1
Height above sea level	**Zs**	57.00	
Exposure Category Coefficient	**zg**	900.00	Table 2-4
Mid-Point of Structure	**Ht.mid**	90.00	
Min Velocity Pressure Coefficient	**Kzmin**	0.85	Table 2-4
Exposure Category Coefficient	**α'**	9.50	Table 2-4
Velocity Pressure Coefficient	**Kz**	1.40	Section 2.6.5.2
Topographic Coefficient	**Kt**	1.00	Table 2-5
Terrain Constant	**Kc**	1.00	Table 2-4
Ground Elevation Factor	**Ke**	1.00	Section 2.6.8
Topographic Category Coefficient	**f**	0.00	Table 2-5
Height Reduction Factor	**Kh**	1.00	Section 2.6.6.2.1
Topographic Factor	**Kzt**	1.00	Section 2.6.6.2.1
Ice Load Importance Factor	**Iti**	1.00	Table 2-3
Wind Direction Probability Factor	**Kd**	0.95	Table 2-2
Height Escalation Factor	**Kiz**	1.17	Section 2.6.10
Gust Effect Factor	**Gh**	1.00	Section 16.6
Design Ice Thickness	**tiz**	1.17	Section 2.6.10
Ice Density	**ρ.ice**	56.00 lbf/ft^3	
Velocity Pressure for Maintenance	**qzm**	3.05	Section 2.6.11.6
Velocity Pressure With Ice	**qzi**	8.48	Section 2.6.11.6
Velocity Pressure No Ice	**qz**	47.22	Section 2.6.11.6

Ka=	0.9

Importance Factor (Earthquake)	I_e	1.00	Table 2-3
Site Class	**Class**	D - Stiff Soil	
Seismic Design Category	**Cat**	B	
MCE_R Ground Motion (period=0.2s)	S_S	0.244	
MCE_R Ground Motion (period=1.0s)	S_1	0.057	
Seismic Design Value at 0.2s	S_{DS}	0.26	
Long-Period Site Coefficient Fv	**Fv**	2.40	Table 2-12
Seismic Design Value at 1.0s	S_{D1}	0.091	Sec. 2.7.5
Long-period Transition Period (s)	T_L	6	

Sesimic Shear		
R	2.000	See 16.7
$C_{S\text{-}calc}$	0.130	See 2.7.7.1.1
$C_{S\text{-}min}$	0.011	See 2.7.7.1.1
C_S	0.130	See 2.7.7.1.1
A_S	1.000	See 16.7

Appurtenance Properties								Loads (force per connection)										
Manufacturer	**Model**	**R/F**	**L**	**W**	**D**	**Weight**	**# Conn**	**Wt**	**Ice Wt**	**F no ice**	**S no ice**	**F ice**	**S ice**	**Fm**	**Sm**	**Eh**	**Ev**	**EPA.F**
CCIAntennas	HPA-65R-BUU-H6	Flat	72.3	14.4	7.3	52.9	2	26.5	43.0	202	117	43	27	13	8	3	1	9
CCIAntennas	OPA65R-BU6DA	Flat	71.2	21	7.8	73.2	2	36.6	45.6	273	121	56	28	18	8	5	2	13
Quintel	QS66512-2	Flat	72	12	9.6	121	2	60.5	52.8	173	144	37	32	11	9	8	3	8
Commscope	SBNHH-1D65A	Flat	55	11.9	7.1	43.5	2	21.8	32.3	125	82	27	19	8	5	3	1	6
CCIAntennas	OPA65R-BU4DA	Flat	48	21	7.8	62.5	2	31.3	32.4	178	75	37	18	12	5	4	2	8
CCIAntennas	QS46512-2	Flat	52	12	10.8	85	2	42.5	42.7	118	108	26	24	8	7	6	2	6
Ericsson	4426 B66	Flat	14.96	13.19	5.8	48.4	2	24.2	10.2	35	15	9	4	2	1	3	1	2
Ericsson	4478 B14	Flat	15	13.2	7.3	59.4	2	29.7	12.2	35	19	9	5	2	1	4	2	2
Ericsson	RRUS-11 B12	Flat	17	17.8	9.2	54	2	27.0	17.7	54	28	12	7	3	2	4	1	3
Ericsson	4478 B5	Flat	18.1	13.5	7.8	56.1	2	28.1	14.4	43	25	10	7	3	2	4	1	2
Ericsson	RRUS-32 B2	Flat	27.2	12.1	7	53	2	26.5	17.2	58	35	14	9	4	2	3	1	3
Ericsson	RRUS-32 B30	Flat	27.2	12.1	7	53	2	26.5	17.2	58	35	14	9	4	2	3	1	3
Raycap	DC6-48-60-18-8F	Round	24	9.7	9.7	32.8	1	32.8	15.6	34	34	8	8	2	2	4	2	1
Raycap	DC6-48-60-0-8F	Round	24	9.7	9.7	32.8	1	32.8	15.6	34	34	8	8	2	2	4	2	1

Shape Properties								Loads (force per connection)										
Shape Type	**Shape**	**R/F**	**L**	**W**	**D**	**Wt (plf)**	**# Conn**	**Wt**	**Ice Wt**	**F no ice**	**S no ice**	**F ice**	**S ice**	**Fm**	**Sm**	**Eh**	**Ev**	**EPA.F**
Solid_Rod	SR ¾" Dia.	Round	53.3	0.75	0.75	1.50	4.44167	6.68	2.7	3	3	2	2	0.21	0.21	0.20	0.08	0.33
Pipe	Pipe 1½ Std.	Round	98.4	1.9	1.9	2.72	8.2	22.30	4.4	8	8	3	3	1	1	0.35	0.14	2
Pipe	Pipe 2 Std.	Round	108	2.38	2.38	3.66	9	32.94	5.1	10	10	4	4	1	1	0.48	0.19	2
Pipe	Pipe 2 x-Strong	Round	156	2.38	2.38	5.03	13	65.39	5.1	10	10	4	4	1	1	1	0.26	3
Plate	PL 1/2 x 3 3/8	Flat	6	3.38	0.5	5.74	0.5	2.87	6.6	14	3	6	3	1	0.18	1	0.30	0.17

(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?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
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	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - 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	Exact Integration
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	ASCE 7-10
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top...	Lcomp bot...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M9	.75 Dia.	36			Lbyy			.65	.65		Lateral
2	M10	.75 Dia.	36			Lbyy			.65	.65		Lateral
3	M11	.75 Dia.	36			Lbyy			.65	.65		Lateral
4	M12	.75 Dia.	36			Lbyy			.65	.65		Lateral
5	M13	.75 Dia.	53.259			Lbyy			.65	.65		Lateral
6	M14	.75 Dia.	53.259			Lbyy			.65	.65		Lateral
7	M23	PIPE_1.5	98.41			Lbyy			1	1		Lateral
8	M24	PIPE_2.0	108	36	36	36	36	36	2.1	2.1		Lateral
9	M25	PIPE_2.0	108	36	36	36	36	36	2.1	2.1		Lateral
10	M26	PIPE_2.0	108	36	36	36	36	36	2.1	2.1		Lateral
11	M27	PIPE_2.0	108	36	36	36	36	36	2.1	2.1		Lateral
12	M30	PIPE_2.0	48	36	36	36	36	36	2.1	2.1		Lateral
13	M1	PIPE_2.0X	156	84	84	84	84	84	2.1	2.1		Lateral
14	M2	PIPE_2.0X	156	84	84	84	84	84	2.1	2.1		Lateral
15	M5	PIPE_2.0X	45.25			Lbyy			.8	.8		Lateral
16	M6	PIPE_2.0X	45.25			Lbyy			.8	.8		Lateral
17	M7	PIPE_2.0X	45.25			Lbyy			.8	.8		Lateral
18	M8	PIPE_2.0X	45.25			Lbyy			.8	.8		Lateral
19	M3	PL 1/2 x 3 3/8	6			Lbyy			.65	.65		Lateral
20	M4	PL 1/2 x 3 3/8	6			Lbyy			.65	.65		Lateral

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		34	124	0
3	Total General		34	124	0
4					
5	Hot Rolled Steel				
6	A500 Gr. 50	PIPE_1.5	1	98.4	.021

Material Takeoff (Continued)

	Material	Size	Pieces	Length[in]	Weight[K]
7	A53 Gr B 50 ksi	PIPE_2.0X	6	493	.196
8	A53 Gr.B	PIPE_2.0	5	480	.139
9	A572 Gr.50	.75 Dia.	6	250.5	.031
10	A572 Gr.50	PL 1/2 x 3 3/8	2	12	.006
11	Total HR Steel		20	1333.9	.393

Basic Load Cases

	BLC Description	Category	X Gravi...	Y Gravi...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	DL	None		-1		24				
2	DLi	None				20		20		
3	WL(0)	None				20		18		
4	WL(90)	None				20		16		
5	WL.i(0)	None				20		18		
6	WL.i(90)	None				20		16		
7	T	None								
8	EH(0)	None				20		20		
9	EH(90)	None				20		20		
10	EV	None				20		20		
11	WM(0)	None				20		18		
12	WM(90)	None				20		16		
13	LM1	None				1				
14	LM2	None				1				
15	LM3	None				1				
16	LV1	None					1			
17	LV2	None					1			
18	LV3	None					1			
19	LV4	None					1			
20	LV5	None					1			
21	LV6	None					1			

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4*DL	Y...	Y		1	1.4																		
2	1.2*DL + 1.0* WL(0)	Y...	Y		1	1.2	3	1																
3	1.2*DL + 1.0* WL(30)	Y...	Y		1	1.2	3	.869	4	.5														
4	1.2*DL + 1.0* WL(60)	Y...	Y		1	1.2	3	.5	4	.869														
5	1.2*DL + 1.0*WL(90)	Y...	Y		1	1.2	4	1																
6	1.2*DL + 1.0*WL(120)	Y...	Y		1	1.2	3	-.5	4	.869														
7	1.2*DL +1.0*WL(150)	Y...	Y		1	1.2	3	-.8...	4	.5														
8	1.2*DL + 1.0 * WL(180)	Y...	Y		1	1.2	3	-1																
9	1.2*DL + 1.0* WL(210)	Y...	Y		1	1.2	3	-.8...	4	-.5														
10	1.2*DL + 1.0* WL(240)	Y...	Y		1	1.2	3	-.5	4	-.8...														
11	1.2*DL + 1.0*WL(270)	Y...	Y		1	1.2	4	-1																
12	1.2*DL + 1.0*WL(300)	Y...	Y		1	1.2	3	.5	4	-.8...														
13	1.2*DL +1.0*WL(330)	Y...	Y		1	1.2	3	.869	4	-.5														
14	1.2*DL+1.0*DLi+1.0*WL.i(0)+1.0*T	Y...	Y		1	1.2	2	1	5	1	7	1												
15	1.2*DL+1.0*DLi+1.0*WL.i(30)+1.0*T	Y...	Y		1	1.2	2	1	5	.866	6	.5	7	1										
16	1.2*DL+1.0*DLi+1.0*WL.i(60)+1.0*T	Y...	Y		1	1.2	2	1	5	.5	6	.866	7	1										
17	1.2*DL+1.0*DLi+1.0*WL.i(90)+1.0*T	Y...	Y		1	1.2	2	1	6	1	7	1												
18	1.2*DL+1.0*DLi+1.0*WL.i(120)+1.0*T	Y...	Y		1	1.2	2	1	5	-.5	6	.866	7	1										
19	1.2*DL+1.0*DLi+1.0*WL.i(150)+1.0*T	Y...	Y		1	1.2	2	1	5	-.8...	6	.5	7	1										
20	1.2*DL+1.0*DLi+1.0*WL.i(180)+1.0*T	Y...	Y		1	1.2	2	1	5	-1	7	1												
21	1.2*DL+1.0*DLi+1.0*WL.i(210)+1.0*T	Y...	Y		1	1.2	2	1	5	-.8...	6	-.5	7	1										
22	1.2*DL+1.0*DLi+1.0*WL.i(240)+1.0*T	Y...	Y		1	1.2	2	1	5	-.5	6	-.8...	7	1										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
23	1.2*DL+1.0*DLi+1.0*WL.i(270)+1.0*T	Y...	Y		1	1.2	2	1	6	-1	7	1												
24	1.2*DL+1.0*DLi+1.0*WL.i(300)+1.0*T	Y...	Y		1	1.2	2	1	5	.5	6	-.8...	7	1										
25	1.2*DL+1.0*DLi+1.0*WL.i(330)+1.0*T	Y...	Y		1	1.2	2	1	5	.866	6	-.5	7	1										
26	1.2*DL+1.0*EH(0)+1.0*EV(+)	Y...	Y		1	1.2	8	1	10	1														
27	1.2*DL+1.0*EH(0)+1.0*EV(-)	Y...	Y		1	1.2	8	1	10	-1														
28	1.2*DL+1.0*EH(90)+1.0*EV(+)	Y...	Y		1	1.2	9	1	10	1														
29	1.2*DL+1.0*EH(90)+1.0*EV(-)	Y...	Y		1	1.2	9	1	10	-1														
30	1.2*DL+1.0*EH(180)+1.0*EV(+)	Y...	Y		1	1.2	8	-1	10	1														
31	1.2*DL+1.0*EH(180)+1.0*EV(-)	Y...	Y		1	1.2	8	-1	10	-1														
32	1.2*DL+1.0*EH(270)+1.0*EV(+)	Y...	Y		1	1.2	9	-1	10	1														
33	1.2*DL+1.0*EH(270)+1.0*EV(-)	Y...	Y		1	1.2	9	-1	10	-1														
34	0.9*DL+1.0*EH(0)-1.0*EV(+)	Y...	Y		1	.9	8	1	10	-1														
35	0.9*DL+1.0*EH(0)-1.0*EV(-)	Y...	Y		1	.9	8	1	10	1														
36	0.9*DL+1.0*EH(90)-1.0*EV(+)	Y...	Y		1	.9	9	1	10	-1														
37	0.9*DL+1.0*EH(90)-1.0*EV(-)	Y...	Y		1	.9	9	1	10	1														
38	0.9*DL+1.0*EH(180)-1.0*EV(+)	Y...	Y		1	.9	8	-1	10	-1														
39	0.9*DL+1.0*EH(180)-1.0*EV(-)	Y...	Y		1	.9	8	-1	10	1														
40	0.9*DL+1.0*EH(270)-1.0*EV(+)	Y...	Y		1	.9	9	-1	10	-1														
41	0.9*DL+1.0*EH(270)-1.0*EV(-)	Y...	Y		1	.9	9	-1	10	1														
42	1.2*DL+1.5*LM1+1.0*WM(0)	Y...	Y		1	1.2	13	1.5	11	1														
43	1.2*DL+1.5*LM1+1.0*WM(30)	Y...	Y		1	1.2	13	1.5	11	.866	12	.5												
44	1.2*DL+1.5*LM1+1.0*WM(60)	Y...	Y		1	1.2	13	1.5	11	.5	12	.866												
45	1.2*DL+1.5*LM1+1.0*WM(90)	Y...	Y		1	1.2	13	1.5	12	1														
46	1.2*DL+1.5*LM1+1.0*WM(120)	Y...	Y		1	1.2	13	1.5	11	-.5	12	.866												
47	1.2*DL+1.5*LM1+1.0*WM(150)	Y...	Y		1	1.2	13	1.5	11	-.8...	12	.5												
48	1.2*DL+1.5*LM1+1.0*WM(180)	Y...	Y		1	1.2	13	1.5	11	-1														
49	1.2*DL+1.5*LM1+1.0*WM(210)	Y...	Y		1	1.2	13	1.5	11	-.8...	12	-.5												
50	1.2*DL+1.5*LM1+1.0*WM(240)	Y...	Y		1	1.2	13	1.5	11	-.5	12	-.8...												
51	1.2*DL+1.5*LM1+1.0*WM(270)	Y...	Y		1	1.2	13	1.5	12	-1														
52	1.2*DL+1.5*LM1+1.0*WM(300)	Y...	Y		1	1.2	13	1.5	11	.5	12	-.8...												
53	1.2*DL+1.5*LM1+1.0*WM(330)	Y...	Y		1	1.2	13	1.5	11	.866	12	-.5												
54	1.2*DL+1.5*LM2+1.0*WM(0)	Y...	Y		1	1.2	14	1.5	11	1														
55	1.2*DL+1.5*LM2+1.0*WM(30)	Y...	Y		1	1.2	14	1.5	11	.866	12	.5												
56	1.2*DL+1.5*LM2+1.0*WM(60)	Y...	Y		1	1.2	14	1.5	11	.5	12	.866												
57	1.2*DL+1.5*LM2+1.0*WM(90)	Y...	Y		1	1.2	14	1.5	12	1														
58	1.2*DL+1.5*LM2+1.0*WM(120)	Y...	Y		1	1.2	14	1.5	11	-.5	12	.866												
59	1.2*DL+1.5*LM2+1.0*WM(150)	Y...	Y		1	1.2	14	1.5	11	-.8...	12	.5												
60	1.2*DL+1.5*LM2+1.0*WM(180)	Y...	Y		1	1.2	14	1.5	11	-1														
61	1.2*DL+1.5*LM2+1.0*WM(210)	Y...	Y		1	1.2	14	1.5	11	-.8...	12	-.5												
62	1.2*DL+1.5*LM2+1.0*WM(240)	Y...	Y		1	1.2	14	1.5	11	-.5	12	-.8...												
63	1.2*DL+1.5*LM2+1.0*WM(270)	Y...	Y		1	1.2	14	1.5	12	-1														
64	1.2*DL+1.5*LM2+1.0*WM(300)	Y...	Y		1	1.2	14	1.5	11	.5	12	-.8...												
65	1.2*DL+1.5*LM2+1.0*WM(330)	Y...	Y		1	1.2	14	1.5	11	.866	12	-.5												
66	1.2*DL+1.5*LM3+1.0*WM(0)	Y...	Y		1	1.2	15	1.5	11	1														
67	1.2*DL+1.5*LM3+1.0*WM(30)	Y...	Y		1	1.2	15	1.5	11	.866	12	.5												
68	1.2*DL+1.5*LM3+1.0*WM(60)	Y...	Y		1	1.2	15	1.5	11	.5	12	.866												
69	1.2*DL+1.5*LM3+1.0*WM(90)	Y...	Y		1	1.2	15	1.5	12	1														
70	1.2*DL+1.5*LM3+1.0*WM(120)	Y...	Y		1	1.2	15	1.5	11	-.5	12	.866												
71	1.2*DL+1.5*LM3+1.0*WM(150)	Y...	Y		1	1.2	15	1.5	11	-.8...	12	.5												
72	1.2*DL+1.5*LM3+1.0*WM(180)	Y...	Y		1	1.2	15	1.5	11	-1														
73	1.2*DL+1.5*LM3+1.0*WM(210)	Y...	Y		1	1.2	15	1.5	11	-.8...	12	-.5												
74	1.2*DL+1.5*LM3+1.0*WM(240)	Y...	Y		1	1.2	15	1.5	11	-.5	12	-.8...												
75	1.2*DL+1.5*LM3+1.0*WM(270)	Y...	Y		1	1.2	15	1.5	12	-1														
76	1.2*DL+1.5*LM3+1.0*WM(300)	Y...	Y		1	1.2	15	1.5	11	.5	12	-.8...												
77	1.2*DL+1.5*LM3+1.0*WM(330)	Y...	Y		1	1.2	15	1.5	11	.866	12	-.5												
78	1.2*DL+1.5*LV1	Y...	Y		1	1.2	16	1.5																
79	1.2*DL+1.5*LV2	Y...	Y		1	1.2	17	1.5																

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
80	1.2*DL+1.5*LV3	Y...	Y		1	1.2	18	1.5																
81	1.2*DL+1.5*LV4	Y...	Y		1	1.2	19	1.5																
82	1.2*DL+1.5*LV5	Y...	Y		1	1.2	20	1.5																
83	1.2*DL+1.5*LV6	Y...	Y		1	1.2	21	1.5																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N23	max	682.044	4	1364.742	19	1578.781	13	65.874	2	0	83	127.63	45
2		min	-1449.986	50	558.551	34	-3168.996	7	-119.388	8	0	1	-45.59	75
3	N31	max	1442.987	45	963.119	25	1657.157	14	21.664	48	0	83	104.685	45
4		min	-547.612	75	389.151	38	58.676	8	-48.127	79	0	1	-40.965	78
5	N49	max	766.577	6	30.657	24	830.348	6	0	83	0	83	0	83
6		min	-765.969	12	8.824	36	-829.651	12	0	1	0	1	0	1
7	Totals:	max	1905.596	5	2350.025	15	2637.426	2						
8		min	-1905.596	11	957.838	38	-2637.424	8						

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

	Member	Shape	Code Ch...	Loc[in]	LC	Shea...	Loc[in]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M2	PIPE_2.0X	.542	118.6...	8	.085	37.375		8	6004.1...	63000	3615	3615	1	H1-1a
2	M25	PIPE_2.0	.477	72	2	.105	45		6	19963....	32130	1871.6...	1871.6...	1	H1-1b
3	M24	PIPE_2.0	.328	72	8	.073	72		8	19963....	32130	1871.6...	1871.6...	1	H1-1b
4	M26	PIPE_2.0	.319	72	13	.095	36		4	19963....	32130	1871.6...	1871.6...	1	H1-1b
5	M3	PL 1/2 x 3 3/8	.271	3	47	.206	3	y	8	71990....	75937.5	791.017	5339.3...	1...	H1-1b
6	M4	PL 1/2 x 3 3/8	.226	3	43	.106	3	y	13	71990....	75937.5	791.017	5339.3...	1...	H1-1b
7	M1	PIPE_2.0X	.166	120.25	47	.051	120.25		46	6004.1...	63000	3615	3615	1	H1-1b
8	M23	PIPE_1.5	.165	98.41	6	.003	98.41		24	6834.9...	33705	1578.75	1578.75	1...	H1-1b*
9	M12	.75 Dia.	.130	36	43	.011	0		6	6408.1...	19880....	248.512	248.512	2...	H1-1b*
10	M11	.75 Dia.	.115	36	45	.010	0		12	6408.1...	19880....	248.512	248.512	2...	H1-1b*
11	M14	.75 Dia.	.099	53.259	46	.010	53.259		3	2927.8...	19880....	248.512	248.512	2...	H1-1b
12	M7	PIPE_2.0X	.099	22.625	81	.051	2.828		62	53566....	63000	3615	3615	1...	H1-1b
13	M30	PIPE_2.0	.098	42	78	.047	6		12	19963....	32130	1871.6...	1871.6...	1	H1-1b
14	M9	.75 Dia.	.092	36	14	.013	0		6	6408.1...	19880....	248.512	248.512	2...	H1-1b*
15	M8	PIPE_2.0X	.092	42.422	47	.059	45.25		60	53566....	63000	3615	3615	2...	H1-1b
16	M13	.75 Dia.	.078	53.259	24	.006	53.259		12	2927.8...	19880....	248.512	248.512	2...	H1-1b
17	M10	.75 Dia.	.077	36	72	.010	0		6	6408.1...	19880....	248.512	248.512	2...	H1-1b*
18	M5	PIPE_2.0X	.075	42.422	71	.062	45.25		69	53566....	63000	3615	3615	2...	H1-1b
19	M27	PIPE_2.0	.071	72	9	.014	72		77	19963....	32130	1871.6...	1871.6...	1	H1-1b
20	M6	PIPE_2.0X	.070	36.294	78	.055	2.828		70	53566....	63000	3615	3615	2...	H1-1b

Stress Ratio < 1.0, members are adequate

Mount-to-Tower Connection Calculations

Existing Sabre sector frame is connected to tower leg via Threaded Rods 5/8" Ø (ASTM A307; nominal tensile strength Fnt=45 ksi and nominal shear strength Fnv=27 ksi according to manufacturer specification)

Maximum Reactions from Risa Mount Analysis per Joint:

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N23	max	682.044	4	1364.742	19	1578.781	13	65.874	2	0	83	127.63	45
2		min	-1449.986	50	558.551	34	-3168.996	7	-119.388	8	0	1	-45.59	75
3	N31	max	1442.987	45	963.119	25	1657.157	14	21.664	48	0	83	104.685	45
4		min	-547.612	75	389.151	38	58.676	8	-48.127	79	0	1	-40.965	78

$X := 1449.986 lbf$ *Maximum Factored Reaction - X direction*

$Y := 1364.742 lbf$ *Maximum Factored Reaction - Y direction*

$Z := 3168.996 lbf$ *Maximum Factored Reaction - Z direction*

$M_x := 119.388\, lbf \cdot ft$ *Maximum Factored Moment - X direction*

$M_z := 127.63\, lbf \cdot ft$ *Maximum Factored Moment - Z direction*

$d := 2in$ *Vertical spacing between the Threaded Rods*

$P_t := \frac{Z}{4} + \frac{M_x}{2.d}$ $P_t = 1150.41 \cdot lbf$ *Factored Tensile Force*

$P_v := \frac{\sqrt{X^2 + Y^2}}{4} + \frac{M_z}{2 \cdot d}$ $P_v = 880.7 \cdot lbf$ *Factored Shear Force*

$d_b := 0.625in$ *Diameter of Threaded Rod*

$A_b := 0.25\pi \cdot d_b^2$ $A_b = 0.31 \cdot in^2$ *Area of Threaded Rod*

$P_{t_rod} := P_t$ $P_{t_rod} = 1150.41 \cdot lbf$ *Tension at Threaded Rod*

$P_{v_rod} := P_v$ $P_{v_rod} = 880.7 \cdot lbf$ *Shear at Threaded Rod*

Tensile and Shear Strength of Rods and Threaded Parts

$F_{nt} := 45ksi$ — *Nominal tensile strength per AISC 360, Table J3.2*

$F_{nv} := 27ksi$ — *Nominal shear strength per AISC 360, Table J3.2*

$\phi_{rod} := 0.75$ — *Resistance Factor (LRFD - AISC 360, Section J3-6)*

$R_{nt} := \phi_{rod} \cdot F_{nt} \cdot A_b$ $\boxed{R_{nt} = 10.35 \cdot kip}$ — *Design Nominal Tensile Strength (AISC 360, Section J3-1)*

$R_{nv} := \phi_{rod} \cdot F_{nv} \cdot A_b$ $\boxed{R_{nv} = 6.21 \cdot kip}$ — *Design Nominal Shear Strength (AISC 360, Section J3-1)*

$\frac{P_{t_rod}}{R_{nt}} = 11.11 \cdot \%$ ***< 30%***

$\frac{P_{v_rod}}{R_{nv}} = 14.18 \cdot \%$ ***< 30%***

Check = "Threaded rods are adequate. Effects of combined stress don't need to be investigated because ratio of either tension ot shear is under 30%

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H6		OPA65R-BU6DA		QS66512-2									
ANTENNA VENDOR	CCI		CCI		Quintel									
ANTENNA SIZE (H x W x D)	72X14.8X9		71.2X21X7.8		72X12X9.6									
ANTENNA WEIGHT	51		60.2		111									
AZIMUTH	30		30		30									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160		160		160									
ANTENNA TIP HEIGHT	163		163		163									
MECHANICAL DOWNTILT	0		0		0									
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in		Built-in		Built-in								
SURGE ARRESTOR (QTY/MODEL)	2	DC Squid	1	DC/Fiber Squid	1	DC/Fiber Squid								
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006		LTE RRH		LTE RRH								
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	4478 B14	1	RRUS-11 B12								
RRH - 850 band (QTY/MODEL)					1	4478 B5								
RRH - 1900 band (QTY/MODEL)					1	RRUS-32 B2								
RRH - AWS band (QTY/MODEL)	1	4426 B66												
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Rev-6 - LTE 6C - Antennae and Radios as per PD - Add BA Octo - Add 4478 - Add DC/Fiber Squid - Replace BB with 2x6630 + IDLe - Remove 1xXMU													
Local Market Note 2														
Local Market Note 3	1x6601 / 2x6630 / 1xXMU03 + IDLe													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60407.A.850.3G.1	60407.A.850.3G.1	CTV21221	CTV21221		UMTS 850	HPA-65R-BUU-H6_849MHz_02DT	13.5	30	2	None	Commscope 1-5/8 (850)	190								1	
	PORT 2	60407.A.AWS.4G.tmp4	60407.A.AWS.4G.4	CTL06122_2A_2	CTL06122_2A_2		LTE AWS	HPA-65R-BUU-H6_2170MHz_03DT	17.27	30	3	Top	Fiber	0						5070.2572		2	

ANTENNA POSITION 2	**PORT 1**	60407.A.700.4G.tmp5	60407.A.700.4G.5	CTL02122_7A_3_F	CTL02122_7A_3_F		LTE 700	OPA65R-BU6D_763MHz_02DT	13.6	30	2	Top	Fiber	0						2951.413		5	
ANTENNA POSITION 3	**PORT 1**	60407.A.850.4G.1	60407.A.850.4G.1	CTL02122_8A_1	CTL02122_8A_1		LTE 850	QS66512-2_850MHz_02DT	13.2	30	2	Top	Fiber	0						1000		3	
	PORT 2	60407.A.700.4G.1	60407.A.700.4G.1	CTL02122_7A_1	CTL02122_7A_1		LTE 700	QS66512-2_722MHz_02DT	13.6	30	2	Top	Fiber	0						1475.7065		3	
	PORT 3	60407.A.WCS.4G.1	60407.A.WCS.4G.1	CTL02122_3A_1	CTL02122_3A_1		LTE WCS	QS66512-2_2355MHz_02DT	16.8	30	2	Top	Fiber	0						1285.2866		4	
	PORT 4	60407.A.1900.4G.tmp1	60407.A.1900.4G.1	CTL06122_9A_1	CTL06122_9A_1		LTE 1900	QS66512-2_1930MHz_03DT	15.9	30	3	Top	Fiber	0						4842.058		4	
	PORT 5	60407.A.1900.4G.tmp2	60407.A.1900.4G.4	CTL06122_9A_2	CTL06122_9A_2		LTE 1900	QS66512-2_1930MHz_03DT	15.9	30	3	Top	Fiber	0						4842.058		4	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	HPA-65R-BUU-H6	OPA65R-BU6DA	QS66512-2				
ANTENNA VENDOR	CCI	CCI	Quintel				
ANTENNA SIZE (H x W x D)	72X14.8X9	71.2X21X7.8	72X12X9.6				
ANTENNA WEIGHT	51	60.2	111				
AZIMUTH	150	150	150				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	160	160	160				
ANTENNA TIP HEIGHT	163	163	163				
MECHANICAL DOWNTILT	0	0	0				
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Built-in	Built-in	Built-in				
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	LTE RRH	LTE RRH	LTE RRH				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)		1 4478 B14	1 RRUS-11 B12				
RRH - 850 band (QTY/MODEL)			1 4478 B5				
RRH - 1900 band (QTY/MODEL)			1 RRUS-32 B2				
RRH - AWS band (QTY/MODEL)	1 4426 B66						
RRH - WCS band (QTY/MODEL)			1 RRUS-32 B30				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Rev-6 - LTE 6C - Antennae and Radios as per PD - Add BA Octo - Add 4478 - Add DC/Fiber Squid - Replace BB with 2x6630 + IDLe - Remove 1xXMU						
Local Market Note 2							
Local Market Note 3	1x6601 / 2x6630 / 1xXMU03 + IDLe						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60407.B.850.3G.1	60407.B.850.3G.1	CTV21222	CTV21222		UMTS 850	HPA-65R-BUU-H6_849MHz_02DT	13.5	150	2	None	Commscope 1-5/8 (850)	190								9	
	PORT 2	60407.B.AWS.4G.tmp4	60407.B.AWS.4G.4	CTL06122_2B_2	CTL06122_2B_2		LTE AWS	HPA-65R-BUU-H6_2170MHz_03DT	0	150	3	Top	Fiber	0						5070.2572		10	

ANTENNA POSITION 2	**PORT 1**	60407.B.700.4G.tmp5	60407.B.700.4G.5	CTL02122_7B_3_F	CTL02122_7B_3_F		LTE 700	OPA65R-BU6D_763MHz_02DT	13.6	150	2	Top	Fiber	0						2951.413		13	
ANTENNA POSITION 3	**PORT 1**	60407.B.850.4G.1	60407.B.850.4G.1	CTL02122_8B_1	CTL02122_8B_1		LTE 850	QS66512-2_850MHz_02DT	13.2	150	2	Top	Fiber	0						1000		11	
	PORT 2	60407.B.700.4G.1	60407.B.700.4G.1	CTL02122_7B_1	CTL02122_7B_1		LTE 700	QS66512-2_722MHz_02DT	13.6	150	2	Top	Fiber	0						1475.7065		11	
	PORT 3	60407.B.WCS.4G.1	60407.B.WCS.4G.1	CTL02122_3B_1	CTL02122_3B_1		LTE WCS	QS66512-2_2355MHz_07DT	16.9	150	7	Top	Fiber	0						1285.2866		12	
	PORT 4	60407.B.1900.4G.tmp1	60407.B.1900.4G.1	CTL06122_9B_1	CTL06122_9B_1		LTE 1900	QS66512-2_1930MHz_04DT	15.6	150	4	Top	Fiber	0						4842.058		12	
	PORT 5	60407.B.1900.4G.tmp2	60407.B.1900.4G.4	CTL06122_9B_2	CTL06122_9B_2		LTE 1900	QS66512-2_1930MHz_04DT	15.6	150	4	Top	Fiber	0						4842.058		12	

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	SBNHH-1D65A		OPA65R-BU4DA		QS46512-2									
ANTENNA VENDOR	Andrew		CCI		Quintel									
ANTENNA SIZE (H x W x D)	55X11.9X7.1		48.2X21X7.8		52X12X10.8									
ANTENNA WEIGHT	33.5		52.5		75									
AZIMUTH	270		270		270									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160		160		160									
ANTENNA TIP HEIGHT	162		162		162									
MECHANICAL DOWNTILT	0		0		0									
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in		Built-in		Built-in								
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)		LTE RRH		LTE RRH		LTE RRH								
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)			1	4478 B14	1	RRUS-11 B12								
RRH - 850 band (QTY/MODEL)					1	4478 B5								
RRH - 1900 band (QTY/MODEL)					1	RRUS-32 B2								
RRH - AWS band (QTY/MODEL)	1	4426 B66												
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Rev-6 - LTE 6C - Antennae and Radios as per PD - Add BA Octo - Add 4478 - Add DC/Fiber Squid - Replace BB with 2x6630 + IDLe - Remove 1xXMU													
Local Market Note 2														
Local Market Note 3	1x6601 / 2x6630 / 1xXMU03 + IDLe													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	60407.C.850.3G.1	60407.C.850.3G.1	CTV21223	CTV21223		UMTS 850	SBNHH-1D65A_851MHz_10DT	12.8	270	10	None	Commscope 1-5/8 (850)	190								17	
	PORT 2	60407.C.AWS.4G.tmp4	60407.C.AWS.4G.4	CTL06122_2C_2	CTL06122_2C_2		LTE AWS	SBNHH-1D65A_2170MHz_03DT	17.1	270	3	Top	Fiber	0						5070.2572		18	

ANTENNA POSITION 2	**PORT 1**	60407.C.700.4G.tmp5	60407.C.700.4G.5	CTL02122_7C_3_F	CTL02122_7C_3_F		LTE 700	OPA65R-BU4D_770MHz_08DT	12.7	270	8	Top	Fiber	0						2951.413		21	
ANTENNA POSITION 3	**PORT 1**	60407.C.850.4G.1	60407.C.850.4G.1	CTL02122_8C_1	CTL02122_8C_1		LTE 850	QS46512-2_850MHz_08DT	12.1	270	8	Top	Fiber	0						1000		19	
	PORT 2	60407.C.700.4G.1	60407.C.700.4G.1	CTL02122_7C_1	CTL02122_7C_1		LTE 700	QS46512-2_722MHz_08DT	12.6	270	8	Top	Fiber	0						1475.7065		19	
	PORT 3	60407.C.WCS.4G.1	60407.C.WCS.4G.1	CTL02122_3C_1	CTL02122_3C_1		LTE WCS	QS46512-2_2355MHz_03DT	16.7	270	3	Top	Fiber	0						1285.2866		20	
	PORT 4	60407.C.1900.4G.tmp1	60407.C.1900.4G.1	CTL06122_9C_1	CTL06122_9C_1		LTE 1900	QS46512-2_1930MHz_04DT	15.6	270	4	Top	Fiber	0						4842.058		20	
	PORT 5	60407.C.1900.4G.tmp2	60407.C.1900.4G.4	CTL06122_9C_2	CTL06122_9C_2		LTE 1900	QS46512-2_1930MHz_04DT	15.6	270	4	Top	Fiber	0						4842.058		20	

ANTENNA MOUNT ANALYSIS CHECKLIST

Mount Detail	
Mount Type	Heavy Duty Sector Frame
Mount Model Number	N/A
If RT, then how is it attached	
If WT, then how is it attached	

Mount Mapping Detail	
Material condition (discoloration, cracks, pitting)	
Mfg. drawing, cutsheet, spec. available?	
Date of mount mapping	
Searched prior OOM for material?	
Photos of installation available?	
Original tower drawings show mounts?	
Searched for previous mapping?	
Is latest mod design (dwgs) available?	
Is the latest structural analysis available?	

Project Detail	
Market	NEW ENGLAND
PACE Project ID	MRCTB047206
Site Name	NORWALK ROCKLAND RD
City, State	NORWALK, CT
RFDS Version Number	1
Initiative (list mult., if applicable)	
Tower Owner	
SA Vendor	
A&E firm (for structural analysis)	
A&E firm (for mapping, if different)	
Last amendment date or last site visit	

Site Information	
Original Lease Date	
FA Code	10035123
Tower Type	Self Support Tower
Tower Height (Ft)	180
AT&T Rad Center # 1	160
AT&T Rad Center # 2	
AT&T Rad Center # 3	

Measurements and Deliverables on sketches	
Pipe / Angle dimenions and lengths	
bolt diameters and lengths	
U-Bolt diameters and lengths	
Steel Grade if indicated	
welds :length and sizes	
appurtenance relative locations	
Grounding Condition	

Equipment Detail Alpha Sector	Model Number for Ant, MW, RRU, TMA, Squid / Size of Coax, DC-Fiber Trunks & Jumpers	Height / COAX-DC-Fiber Trunk & Jumper Lengths in feet	Approx Az	mount position location
Antennas	(1) CCI HPA-65R-BUU-H6			
Antennas	(1) CCI OPA65R-BU6DA			
Antennas	(1) Quintel QS66512-2			
RRU	(1) Ericsson 4426 B66			
RRU	(1) Ericsson 4478 B14			
RRU	(1) Ericsson RRUS-11 B12			
RRU	(1) Ericsson 4478 B5			
RRU	(1) Ericsson RRUS-32 B2			
RRU	(1) Ericsson RRUS-32 B30			
Diplexer				
Coax				
RET (not imbedded in antenna)				
DC Cable				
Fiber Cable				
Squid	(2) Raycap DC6-48-60-18-8F (2) Raycap DC6-48-60-0-8F			

Equipment Detail Beta Sector	Model Number for Ant, MW, RRU, TMA, Squid / Size of Coax, DC-Fiber Trunks & Jumpers	Height / COAX-DC-Fiber Trunk & Jumper Lengths in feet	Approx Az	mount position location
Antennas	(1) CCI HPA-65R-BUU-H6			
Antennas	(1) CCI OPA65R-BU6DA			
Antennas	(1) Quintel QS66512-2			
RRU	(1) Ericsson 4426 B66			
RRU	(1) Ericsson 4478 B14			
RRU	(1) Ericsson RRUS-11 B12			
RRU	(1) Ericsson 4478 B5			
RRU	(1) Ericsson RRUS-32 B2			
RRU	(1) Ericsson RRUS-32 B30			
Diplexer				
Coax				
RET (not imbedded in antenna)				
DC Cable				
Fiber Cable				
Squid				

Equipment Detail Gamma Sector	Model Number for Ant, MW, RRU, TMA, Squid / Size of Coax, DC-Fiber Trunks & Jumpers	Height / COAX-DC-Fiber Trunk & Jumper Lengths in feet	Approx Az	mount position location
Antennas	(1) Andrew SBNHH-1D65A			
Antennas	(1) CCI OPA65R-BU4DA			
Antennas	(1) Quintel QS46512-2			
RRU	(1) Ericsson 4426 B66			
RRU	(1) Ericsson 4478 B14			
RRU	(1) Ericsson RRUS-11 B12			
RRU	(1) Ericsson 4478 B5			
RRU	(1) Ericsson RRUS-32 B2			
RRU	(1) Ericsson RRUS-32 B30			
Diplexer				
Coax				
RET (not imbedded in antenna)				
DC Cable				
Fiber Cable				
Squid				

Comments

Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, September 10, 2020 9:59 AM
To: Kristina Cottone
Subject: FedEx Shipment 771313399817: Your package has been delivered

Hi. Your package was delivered Thu, 09/10/2020 at 9:57am.

Delivered to 125 EAST AVE, Norwalk, CT 06851
Received by TTIM

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771313399817
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	City of Norwalk ATTN: Building Department Willaim I 125 East Ave

	Room 121 NORWALK, CT, US, 06851
REFERENCE	CTL02122 - Norwalk
SHIP DATE	Wed 9/09/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	NORWALK, CT, US, 06851
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground

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All weights are estimated.

Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, September 10, 2020 9:58 AM
To: Kristina Cottone
Subject: FedEx Shipment 771314022468: Your package has been delivered

Hi. Your package was delivered Thu, 09/10/2020 at 9:57am.

Delivered to 125 EAST AVE, Norwalk, CT 06851
Received by TTIM

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771314022468
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	City of Norwalk ATTN: Harry Rilling Mayor

	125 East Ave NORWALK, CT, US, 06851
REFERENCE	CTL02122 - Norwalk
SHIP DATE	Wed 9/09/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	NORWALK, CT, US, 06851
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground

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Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, September 10, 2020 3:04 PM
To: Kristina Cottone
Subject: FedEx Shipment 771314113444: Your package has been delivered

Hi. Your package was delivered Thu, 09/10/2020 at 2:36pm.

Delivered to 3 CORPORATE DR, Clifton Park, NY 12065
Received by MFERRARI

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771314113444
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	Crown Castle Michael Ferrari 3 Corporate Park Drive

	Suite 101 CLIFTON PARK, NY, US, 12065
REFERENCE	CTL02122 - Norwalk
SHIP DATE	Wed 9/09/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	CLIFTON PARK, NY, US, 12065
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground

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All weights are estimated.

Kristina Cottone

From: auto-reply@usps.com
Sent: Tuesday, September 15, 2020 1:02 PM
To: Kristina Cottone
Subject: USPS® Item Delivered, Left with Individual 9505510019660254441766

UNITED STAT
POSTAL SERV

Hello **Kristina Cottone**,

Your item was delivered to an individual at the address at 1:02 pm on September 12, 2020 in CANONSBURG, PA 15317.

Tracking Number: **9505510019660254441766**

Delivered, Left with Individual

Tracking & Delivery Options

My Account

Visit **USPS Tracking**® to check the most up-to-date status of your package. Sign up for **Informed Delivery**® to digitally preview the address side of your incoming letter-sized mail and manage your packages scheduled to arrive soon! To update how frequently you receive emails from USPS, log in to your **USPS.com** account.

Want regular updates on your package? **Set up text alerts**.

INFORMED DELIVERY®
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PROJECT:	LTE 6C
SITE NUMBER:	CTL02122
FA NUMBER:	10035123
PTN NUMBER:	2051A0VABB
PACE NUMBER:	MRCTB047206
CROWN BU#:	817133
SITE NAME:	NORWALK ROCKLAND RD
SITE ADDRESS:	50 ROCKLAND ROAD NORWALK, CT 06854

at&t
550 COCHITUATE ROAD
SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

FULLERTON
ENGINEERING · DESIGN
1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
TEL: 847-908-8400
COA# PEC.0001899
www.FullertonEngineering.com

PROJECT INFORMATION

SITE NAME:	NORWALK ROCKLAND RD
SITE NUMBER:	CTL02122
SITE ADDRESS:	50 ROCKLAND ROAD NORWALK, CT 06854
FA NUMBER:	10035123
PTN NUMBER:	2051A0VABB
PACE NUMBER:	MRCTB047206
USID NUMBER:	60407
CROWN BU#:	817133
APPLICANT:	AT&T WIRELESS 550 COCHITUATE ROAD SUITE 550 13 AND 14 FRAMINGHAM, MA 01701
TOWER OWNER:	CROWN CASTLE INTERNATIONAL 12 GILL STREET, SUITE 5800 WOBURN, MA 01801
JURISDICTION:	FAIRFIELD COUNTY
COUNTY:	FAIRFIELD
SITE COORDINATES FROM	(RFDS)
LATITUDE:	41.0813811°
LONGITUDE:	-73.4309431°
GROUND ELEV.:	60'
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
AT&T RF MANAGER:	DEEPAK RATHORE
PHONE:	(860) 965-3068
EMAIL:	dr701e@att.com

PROJECT CONSULTANTS

PROJECT MANAGER:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	EDWARD WEISSMAN (917) 528-1857
EMAIL:	Edward.Weissman@smartlinkllc.com
SITE AQUISITION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	SHARON KEEFE (978) 930-3918
EMAIL:	Sharon.Keefe@smartlinkllc.com
ENGINEER/ARCHITECT:	FULLERTON ENGINEERING CONSULTANTS, P.C.
ADDRESS:	1100 E. WOODFIELD ROAD, SUITE 500 SCHAUMBURG, IL 60173
CONTACT:	MILEN DIMITROV (847) 908-8439
EMAIL:	MDimitrov@FullertonEngineering.com
CONSTRUCTION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	MARK DONNELLY (617) 515-2080
EMAIL:	mark.donnelly@smartlinkllc.com

SCOPE OF WORK

LTE 700 WILL BE 6C AT THE SITE WITH BRONZE CONFIGURATION.
PROPOSED 6C PROJECT SCOPE HEREIN BASED ON RFDS ID # 3719844, VERSION 1.00 LAST UPDATED 03/27/20.

- (3) NEW ANTENNAS
- (3) NEW RRUS-4478 B14
- (1) NEW RAYCAP DC-6 UNIT
- (1) NEW FIBER CABLE
- (2) NEW DC POWER CABLE
- (1) EXISTING XMU CARD TO BE REMOVED
- (2) NEW RBS 6630
- INSTALL NEW IDLe CABLES

- CONTRACTOR SHALL FURNISH ALL MATERIAL WITH THE EXCEPTION OF AT&T SUPPLIED MATERIAL.
- ALL MATERIAL SHALL BE INSTALLED BY THE CONTRACTOR, UNLESS STATED OTHERWISE.

SITE LOCATION MAP

DIRECTIONS

SCAN QR CODE FOR LINK TO SITE LOCATION MAP

APPLICABLE BUILDING CODES AND STANDARDS

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES.

BUILDING CODE: 2015 INTERNATIONAL BUILDING CODE
2018 CONNECTICUT STATE BUILDING CODE SUPPLEMENT

ELECTRICAL CODE: 2017 NATIONAL ELECTRIC CODE

- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- ADA ACCESS REQUIREMENTS ARE NOT REQUIRED.
- THIS FACILITY DOES NOT REQUIRE POTABLE WATER AND WILL NOT PRODUCE ANY SEWAGE

DRAWING INDEX

T1	TITLE SHEET
SP1	NOTES AND SPECIFICATIONS
SP2	NOTES AND SPECIFICATIONS
A1	COMPOUND PLAN
A2	EQUIPMENT PLAN
A3	ELEVATIONS
A4	ANTENNA PLANS
A5	EQUIPMENT DETAILS
A6	ANTENNA & CABLE CONFIGURATION
A7	CABLE NOTES AND COLOR CODING
A8	GROUNDING DETAILS
A9	PLUMBING DIAGRAMS

NOTE: DRAWING SCALES ARE FOR 11"x17" SHEETS UNLESS OTHERWISE NOTED

REV	DATE	DESCRIPTION	BY
0	06/08/20	90% REVIEW	MK
1	06/22/20	FOR PERMIT	KC
2	07/06/20	FOR PERMIT	KC
3	07/24/20	FOR PERMIT	KC

I HEREBY CERTIFY THAT THESE DRAWINGS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE CODES.

SITE NAME
NORWALK ROCKLAND RD

SITE NUMBER:
CTL02122

SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
TITLE SHEET

SHEET NUMBER
T1

PROJECT# 2020.0032.0029

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR/CM – SMARTLINK
   OWNER – AT&T WIRELESS
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2–A OT 2–A:10–B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE–APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS–BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING

40. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA–222 OR APPLICABLE LOCAL CODES.
41. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT–DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
42. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC–COATING (HOT–DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
43. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
44. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
45. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
46. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50–OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
47. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/– 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/– 0.5% AS DEFINED BY THE RFDS. REFER TO ND–00246.
48. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
49. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
50. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

51. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
52. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.

FIBER & POWER CABLE MOUNTING

53. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
54. THE TYPE TC–ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC–ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
55. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC–ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

62. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO

    ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
63. CONTRACTOR SHALL VERIFY THE DOWN–TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
64. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION.
65. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'–0".
66. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'–0" OC.
67. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
68. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
69. CONTRACTOR SHALL PROVIDE STRAIN–RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN–RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
70. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

71. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
72. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
73. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
74. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE–HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
75. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS
76. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'–0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
77. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'–0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · PROFESSIONAL ENGINEER

SITE NAME
NORWALK
ROCKLAND RD

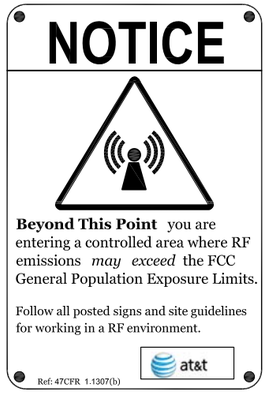
SITE NUMBER:
CTL02122

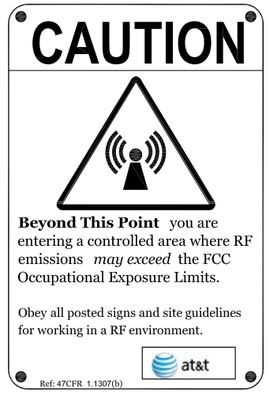
SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP1

PROJECT# 2020.0032.0029





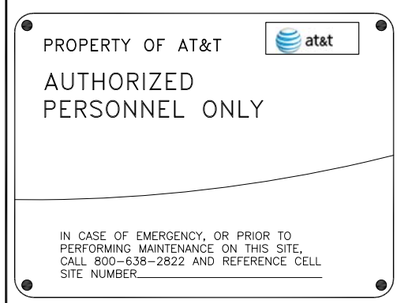
ALERTING SIGNS

ALERTING SIGN
(FOR CELL SITE BATTERIES)

ALERTING SIGN
(FOR DIESEL FUEL)

ALERTING SIGN
(FOR PROPANE)

ALERTING SIGN



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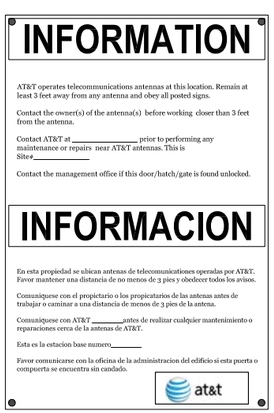

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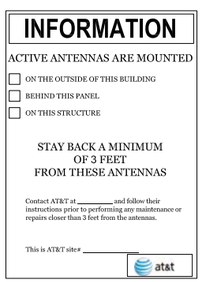

INFO SIGN #2

INFO SIGN #3

GENERAL SIGNAGE GUIDELINES

STRUCTURE TYPE	INFO SIGN #1	INFO SIGN #2	INFO SIGN #3	INFO SIGN #4	STRIPING	NOTICE SIGN	CAUTION SIGN
TOWERS							
MONOPOLE/MONOPINE/MONOPALM	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			AT THE HEIGHT OF THE FIRST CLIMBING STEP, MIN 9 FT ABOVE GROUND
SEC TOWERS/TOWERS WITH HIGH VOLTAGE	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
LIGHT POLES/FLAG POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
UTILITY WOOD POLES (JPA)	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		IF GP MAX VALUE OF MPE AT ANTENNA LEVEL IS: 0-99%; NOTICE SIGN; OVER 99%: CAUTION SIGN AT NO LESS THAN 3FT BELOW ANTENNA AND 9FT ABOVE GROUND	
MICROCELLS MOUNTED ON NON-JPA POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		NOTICE OR CAUTION SIGN AT NO LESS THAN 9FT ABOVE GROUND: ONLY IF THE EXPOSURE EXCEEDS 90% OF THE GENERAL PUBLIC EXPOSURE AT EXPOSURE AT 6FT ABOVE GROUND OR AT OUTSIDE OF SURFACE OF ADJACENT BUILDING	
TOWERS							
AT ALL ACCESS POINTS TO THE ROOF	X			X			
ON ANTENNAS	X		X	X			
CONCEALED ANTENNAS	X	X		X			
ANTENNAS MOUNTED FACING OUTSIDE THE BUILDING	X	X		X			
ANTENNAS ON SUPPORT STRUCTURE	X	X		X			
ROOFVIEW GRAPH						EITHER NOTICE OR CAUTION SIGN (BASED ON ROOFVIEW RESULTS) AT ANTENNA /BARRIER	
RADIATION AREA IS WITHIN 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X			
RADIATION AREA IS BEYOND 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X	DIAGONAL, YELLOW STRIPING AS TO ROOFVIEW GRAPH		
CHURCH STEEPLES	ACCESS TO STEEPLE	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO STEEPLE			CAUTION SIGN AT THE ANTENNAS
WATER STATIONS	ACCESS TO LADDER	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO LADDER			CAUTION SIGN BESIDE INFO SIGN #1, MIN. 9FT ABOVE GROUND

NOTES FOR ROOFTOP SITES:

1. EITHER NOTICE OR CAUTION SIGNS NEED TO BE POSTED AT EACH SECTOR AS CLOSE AS POSSIBLE TO: THE OUTER EDGE OF THE STRIPED OFF AREA OR THE OUTER ANTENNAS OF THE SECTOR
2. IF ROOFVIEWS SHOWS: ONLY BLUE = NOTICE SIGN, BLUE AND YELLOW = CAUTION SIGN, ONLY YELLOW = CAUTION SIGN TO BE INSTALLED
3. SHOULD THE REQUIRED STRIPING AREAS INTERFERE WITH ANY STRUCTURE OR EQUIPMENT (A/C, VENTS, ROOF HATCH, DOORS, OTHER ANTENNAS, DISHES, ETC.). PLEASE NOTIFY AT&T TO MODIFY THE STRIPING AREA, PRIOR TO STARTING THE WORK.

SIGNAGE GUIDELINES CHART

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3	07/24/20	FOR PERMIT	KC

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NORWALK ROCKLAND RD

SITE NUMBER:
CTL02122

SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
NOTES AND SPECIFICATIONS

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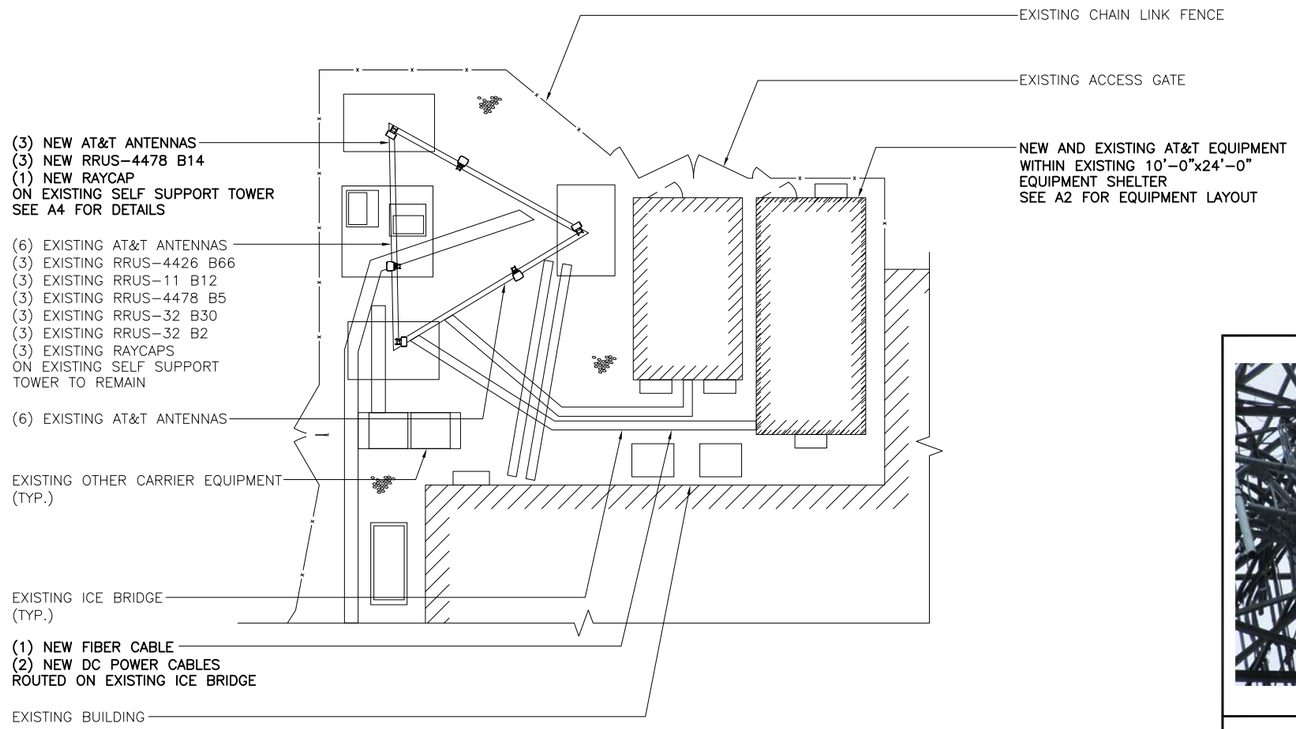
PROJECT# 2020.0032.0029

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
℄	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT(FEET)
EGB	EQUIPMENT GROUND BAR
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ELEV	ELEVATION
EQUIP	EQUIPMENT
(E)	EXISTING
EXT	EXTERIOR
FND	FOUNDATION
F	FIBER
FIF	FACILITY INTERFACE FRAME
GA	GAUGE
GALV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE COMMUNICATION
LTE	LONG TERM EVOLUTION
MAX	MAXIMUM
MCPA	MULTI-CARRIER POWER AMPLIFIER
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTS	MANUAL TRANSFER SWITCH
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OE/OT	OVERHEAD ELECTRIC/TELCO
PPC	POWER PROTECTION CABINET
PL	PROPERY LINE
RBS	RADIO BASED STATION
RET	REMOTE ELECTRIC TILT
RRU	REMOTE RADIO UNIT
RGS	RIGID GALVANIZED STEEL
IN	INCH(ES)
INT	INTERIOR
LB(S), #	POUND(S)
SF	SQUARE FOOT
STL	STEEL
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UE/UT	UNDERGROUND ELECTRIC/TELCO
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELE-COMMUNICATION SYSTEM
VIF	VERIFY IN FIELD
W/	WITH
XFMR	TRANSFORMER

SYMBOLS

- REVISION
- WORK POINT
- UTILITY POLE
- COMPRESSED STONE
- BRICK
- GRAVEL
- CONCRETE
- MASONRY
- EARTH
- STEEL
- CENTERLINE
- PROPERTY LINE
- LEASE LINE
- EASEMENT LINE
- CHAIN LINK FENCE
- WOOD FENCE
- UE — BELOW GRADE ELECTRIC
- UT — BELOW GRADE TELEPHONE
- OE/OT — OVERHEAD ELECTRIC/TELEPHONE
- SECTION REFERENCE



COMPOUND PLAN — 0 4' 8' 16' 24' — SCALE: 1/16" = 1'-0" — 1

SITE PHOTO 1 — SCALE: N.T.S. — 2

SITE PHOTO 2 — SCALE: N.T.S. — 3

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STATE OF CONNECTICUT — HENRY M. BELLAGAMBA — 25358 — LICENSED PROFESSIONAL ENGINEER

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ROCKLAND RD

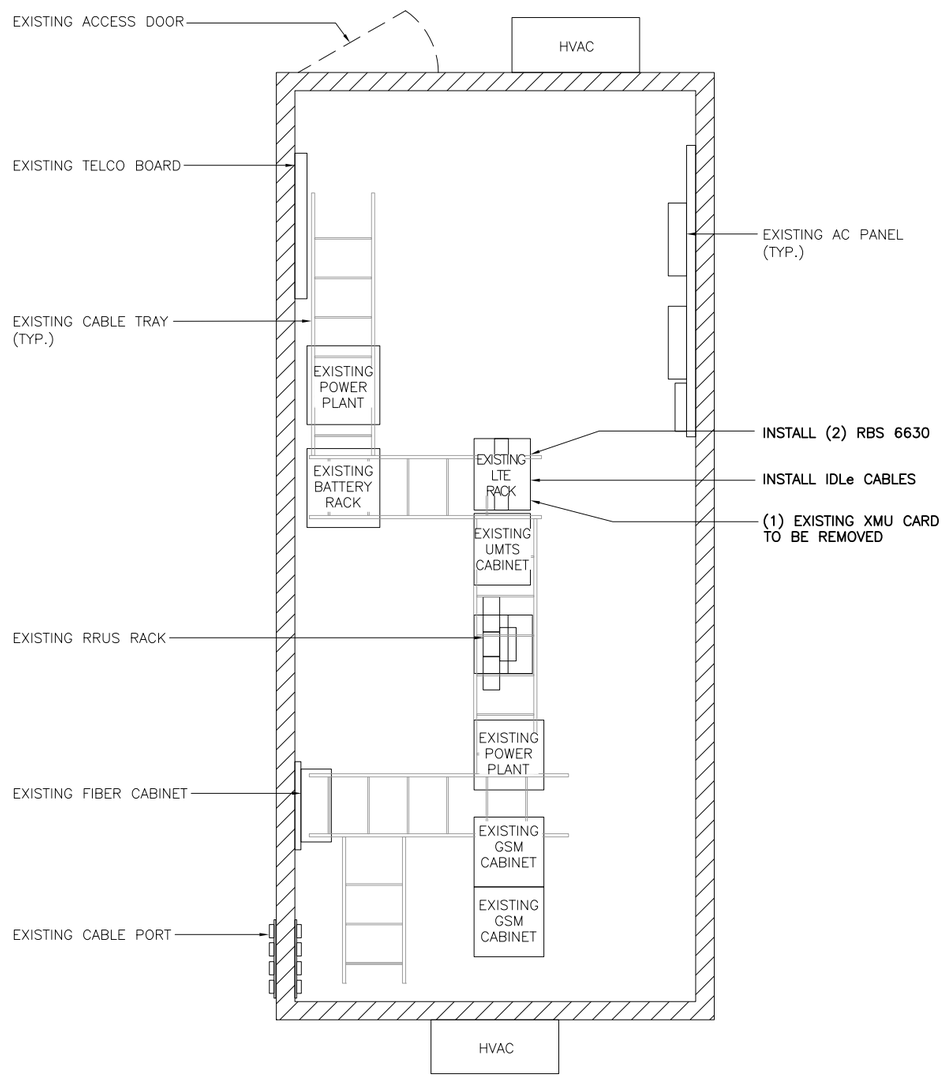
SITE NUMBER:
CTL02122

SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
COMPOUND PLAN

SHEET NUMBER
A1

PROJECT# 2020.0032.0029



EQUIPMENT PLAN

0 1' 2' 4' 6'

SCALE: 1/4" = 1'-0"

1

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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · LICENSED PROFESSIONAL ENGINEER

SITE NAME

NORWALK
ROCKLAND RD

SITE NUMBER:

CTL02122

SITE ADDRESS

50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME

EQUIPMENT
PLAN

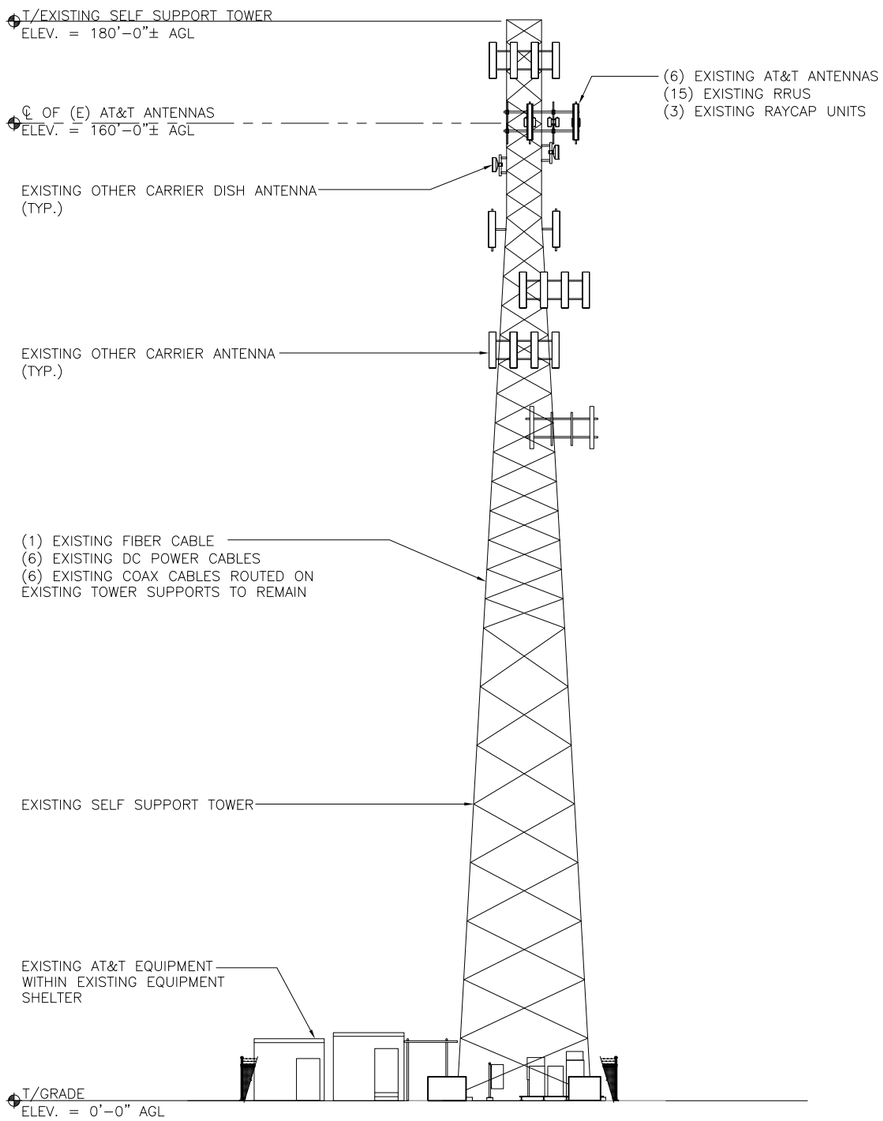
SHEET NUMBER

A2

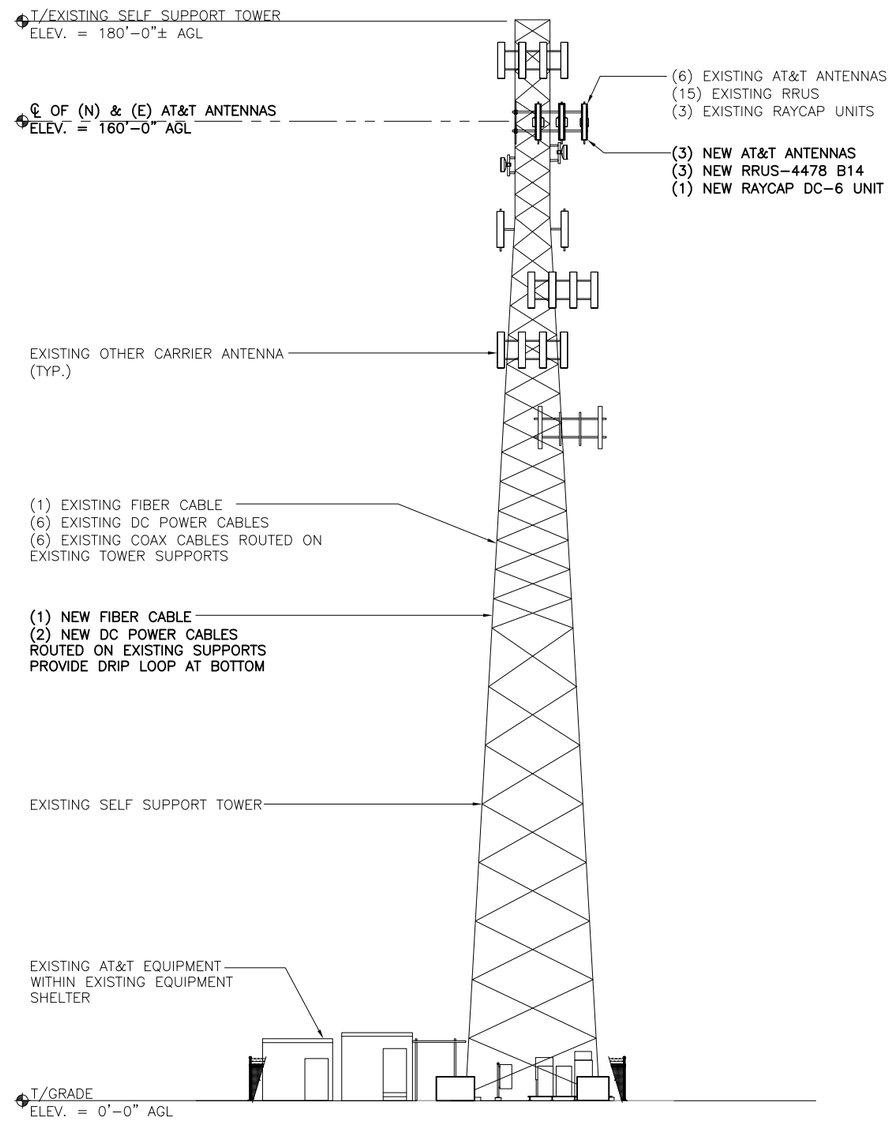
PROJECT# 2020.0032.0029

NOTES:

1. CALCULATIONS FOR THE STRUCTURE WERE PREPARED BY OTHERS AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
2. CALCULATIONS FOR THE ANTENNA MOUNTS WERE PREPARED BY FULLERTON AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
3. CABLES NOT SHOWN FOR CLARITY



EXISTING ELEVATION SCALE: N.T.S. 1



NEW ELEVATION SCALE: N.T.S. 2

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1	06/22/20	FOR PERMIT	KC
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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · LICENSED PROFESSIONAL ENGINEER

SITE NAME
NORWALK
ROCKLAND RD

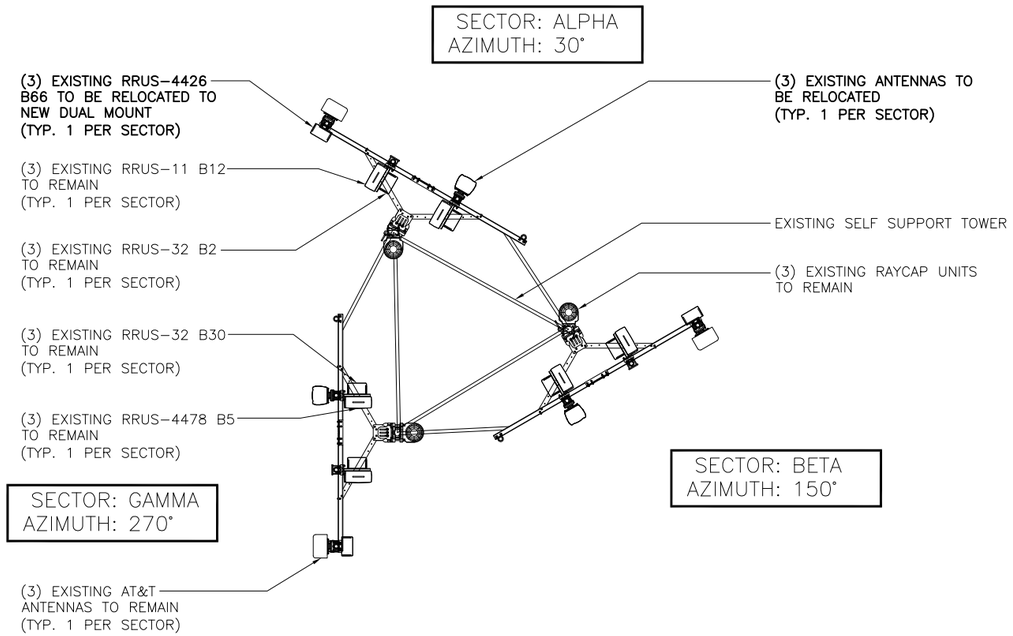
SITE NUMBER:
CTL02122

SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
ELEVATIONS

SHEET NUMBER
A3

PROJECT# 2020.0032.0029



EXISTING ANTENNA PLAN

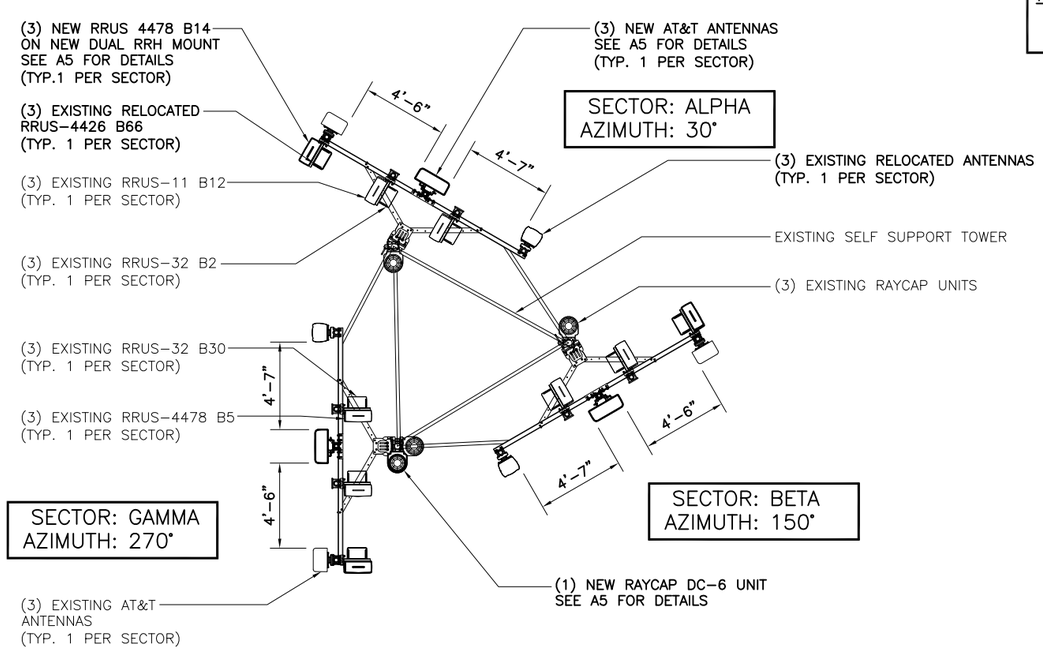
0 1' 2' 4' 8'

SCALE: 3/16" = 1'-0"

1

NOTES:
1. EXISTING ANTENNA MOUNTING PIPE TO BE REUSED, RELOCATED OR REPLACED AS REQUIRED
2. IF REQUIRED INSTALL NEW GALV. MOUNTING PIPE(S) 2.5 STD. (2-7/8" O.D.)

NOTES:
1. 3 FEET MINIMUM SEPARATION BETWEEN LTE ANTENNAS
2. 6 FEET MINIMUM SEPARATION BETWEEN 700DE & 700BC



FINAL ANTENNA PLAN

0 1' 2' 4' 8'

SCALE: 3/16" = 1'-0"

2

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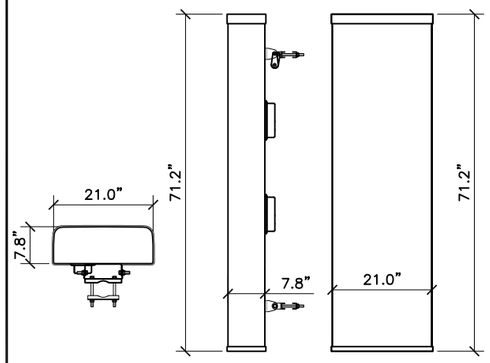
SHEET NAME
ANTENNA
PLANS

SHEET NUMBER
A4

PROJECT# 2020.0032.0029



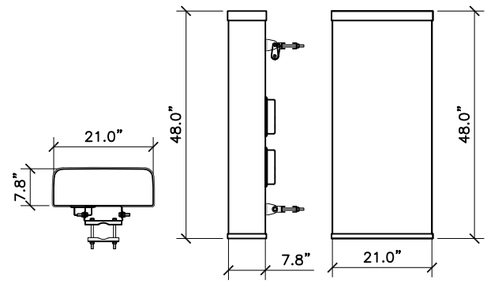
PLAN VIEW SIDE VIEW FRONT VIEW

CCI – OPA65R–BU6DA

MULTI–BAND EIGHT–PORT ANTENNA

FREQUENCY RANGE	4 x 698–896 MHz 4 x 1695–2400 MHz
ANTENNA	63.2 Lbs
BRACKET	12 Lbs
TOTAL WEIGHT	75.2 Lbs

ANTENNA SPEC SCALE: N.T.S. 1



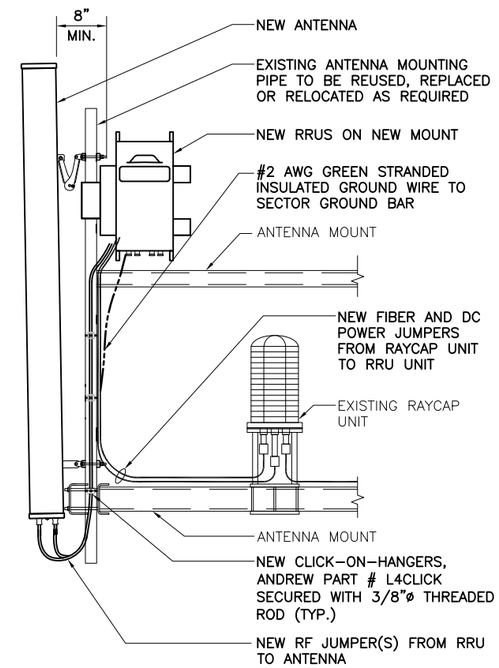
PLAN VIEW SIDE VIEW FRONT VIEW

CCI – OPA65R–BU4DA

MULTI–BAND EIGHT–PORT ANTENNA

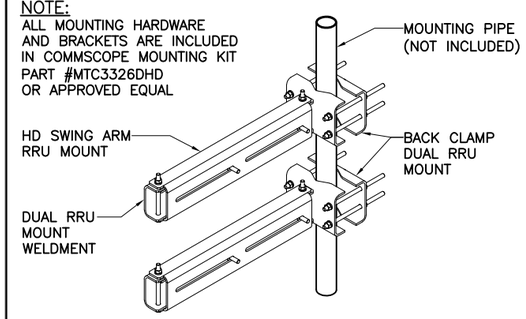
FREQUENCY RANGE	4 x 698–896 MHz 4 x 1695–2400 MHz
ANTENNA	52.5 Lbs
BRACKET	12 Lbs
TOTAL WEIGHT	74.5 Lbs

ANTENNA SPEC SCALE: N.T.S. 2

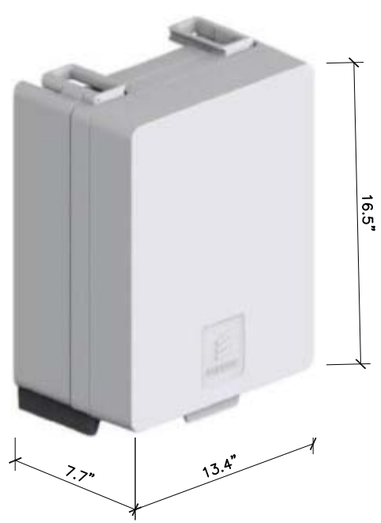


ANTENNA SCHEMATIC SCALE: N.T.S. 3

NOTE:
ALL MOUNTING HARDWARE AND BRACKETS ARE INCLUDED IN COMMSCOPE MOUNTING KIT PART #MTC3326DHD OR APPROVED EQUAL



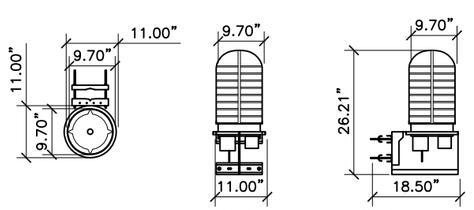
RRH MOUNT DETAIL SCALE: N.T.S. 4



ERICSSON – RRUS 4478 B14

FREQUENCY RANGE	TX 758–768 MHz RX 788–798 MHz
TOTAL WEIGHT	59.9 Lbs

RRU SPEC SCALE: N.T.S. 5



PLAN VIEW FRONT VIEW SIDE VIEW

RAYCAP – DC6–48–60–18–8F

TOWER DC OVER VOLTAGE PROTECTION POWER CONNECTION SOLUTION

UNIT WEIGHT 32.8 Lbs

RAYCAP SPEC SCALE: N.T.S. 6

NOT USED SCALE: N.T.S. 7

NOT USED SCALE: N.T.S. 8

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NORWALK, CT 06854

SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5

PROJECT# 2020.0032.0029

FINAL ANTENNA CONFIGURATION AND CABLE SCHEDULE
SUPPLIED BY AT&T WIRELESS, FROM RF CONFIG. DATED (03/27/20)

SECTOR	ANTENNA NUMBER	ANTENNA STATUS & TYPE	ANTENNA MODEL NUMBER	ANTENNA VENDOR	TMA/RRU UNIT	AZIMUTH	ANTENNA CL FROM GROUND	CABLE FEEDER TYPE	CABLE FEEDER LENGTH	RAYCAP UNIT
ALPHA	A-1	(E) UMTS 850 LTE AWS ANTENNA	HPA-65R-BUU-H6	CCI	(1) EXISTING RRUS 4426 B66	30°	160'-0"	(1) 1-5/8"ø LDF7-50A	200'-0"	(1) (E) DC6-48-60-18-8F UNIT
								(1) 1-5/8"ø LDF7-50A	200'-0"	
	A-2	**(N) LTE 700 ANTENNA**	**OPA65R-BU6DA**	**CCI**	**(1) NEW RRUS 4478 B14**	**30°**	160'-0"	(1) EXISTING FIBER CABLE	200'-0"	
								(2) EXISTING DC POWER CABLE	200'-0"	
	A-3	(E) LTE 850/700/ WCS/1900 ANTENNA	QS66512-2	QUINTEL	(1) EXISTING RRUS-11 B12 (1) EXISTING RRUS 4478 B5 (1 EXISTING) RRUS 32 B2 (1) EXISTING RRUS 32 B30	**30°**	160'-0"	**SEE ANTENNA A-1 FOR CABLE TYPE AND LENGTH**		
	A-4	–	–	–	–	–	–	–		
BETA	B-1	(E) UMTS 850 LTE AWS ANTENNA	HPA-65R-BUU-H6	CCI	(1) EXISTING RRUS 4426 B66	150°	160'-0"	(1) 1-5/8"ø LDF7-50A	200'-0"	(1) (E) DC6-48-60-0-8F UNIT
								(1) 1-5/8"ø LDF7-50A	200'-0"	
	B-2	**(N) LTE 700 ANTENNA**	**OPA65R-BU6DA**	**CCI**	**(1) NEW RRUS 4478 B14**	**150°**	160'-0"	**SEE ANTENNA A-2 FOR FIBER CABLE**		
								(2) EXISTING DC POWER CABLE	200'-0"	
	B-3	(E) LTE 850/700/ WCS/1900 ANTENNA	QS66512-2	QUINTEL	(1) EXISTING RRUS-11 B12 (1) EXISTING RRUS 4478 B5 (1 EXISTING) RRUS 32 B2 (1) EXISTING RRUS 32 B30	150°	160'-0"	**SEE ANTENNA B-1 FOR CABLE TYPE AND LENGTH**		
	B-4	–	–	–	–	–	–	–		
GAMMA	C-1	(E) UMTS 850 LTE AWS ANTENNA	SBNHH-1D65A	ANDREW	(1) EXISTING RRUS 4426 B66	270°	160'-0"	(1) 1-5/8"ø LDF7-50A	200'-0"	(1) (E) DC6-48-60-0-8F UNIT **(1) (N) DC6-48-60-18-8F UNIT**
								(1) 1-5/8"ø LDF7-50A	200'-0"	
	C-2	**(N) LTE 700 ANTENNA**	**OPA65R-BU4DA**	**CCI**	**(1) NEW RRUS 4478 B14**	**270°**	160'-0"	**SEE ANTENNA A-2 FOR FIBER CABLE**		
								(2) EXISTING DC POWER CABLE	200'-0"	
	C-3	(E) LTE 850/700/ WCS/1900 ANTENNA	QS46512-2	QUINTEL	(1) EXISTING RRUS-11 B12 (1) EXISTING RRUS 4478 B5 (1 EXISTING) RRUS 32 B2 (1) EXISTING RRUS 32 B30	270°	160'-0"	**(1) NEW FIBER CABLE**	**200'-0"**	
								(2) NEW DC POWER CABLE	**200'-0"**	
	C-4	–	–	–	–	–	–	–		

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ROCKLAND RD

SITE NUMBER:
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SITE ADDRESS
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET NAME
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A6

1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNAS SHALL BE ADJUSTED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT SHADOWING AND TO MEET THE SYSTEM REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE ANTENNA WITH THE AT&T WIRELESS PROJECT MANAGER.
4. VERIFY TYPE AND SIZE OF TOWER LEG PRIOR TO ORDERING ANY ANTENNA MOUNT.
5. UNLESS NOTED OTHERWISE THE CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY.
6. ANTENNA AZIMUTHS ARE DEGREES OFF OF TRUE NORTH, BEARING CLOCKWISE, IN WHICH ANTENNA FACE IS DIRECTED. ALL ANTENNAS (AND SUPPORTING STRUCTURES AS PRACTICAL) SHALL BE ACCURATELY ORIENTED IN THE SPECIFIED DIRECTION.
7. CONTRACTOR SHALL VERIFY ALL RF INFORMATION PRIOR TO CONSTRUCTION.
8. SWEEP TEST SHALL BE PERFORMED BY GENERAL CONTRACTOR AND SUBMITTED TO AT&T WIRELESS CONSTRUCTION SPECIALIST. TEST SHALL BE PERFORMED PER AT&T WIRELESS STANDARDS.
9. CABLE LENGTHS WERE DETERMINED BASED ON THE DESIGN DRAWING. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
10. CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

ANTENNA AND CABLING NOTES

SCALE: N.T.S. | 1

RF, DC, & COAX CABLE MARKING LOCATIONS TABLE

NO	LOCATIONS
1	EACH TOP-JUMPER SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS.
2	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
3	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
4	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.
5	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.

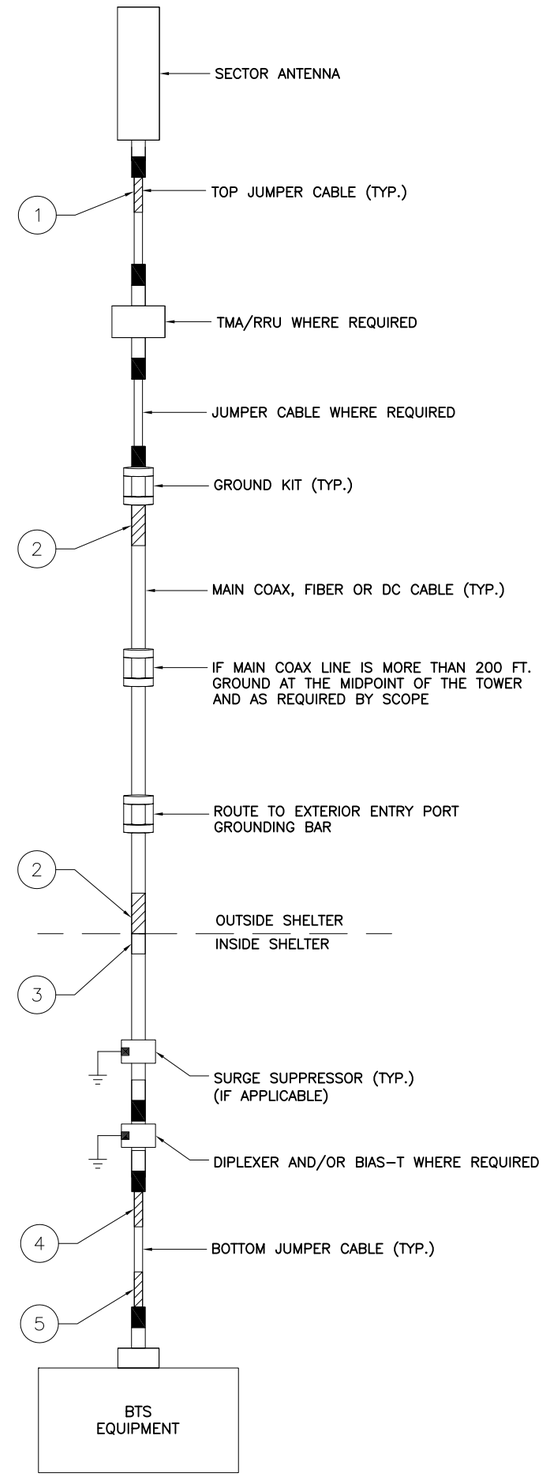
CABLE MARKING DIAGRAM

SCALE: N.T.S. | 2

1. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE.
2. THE STANDARD IS BASED ON EIGHT COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR CONTRACTOR ON SITE.
3. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE COLOR CHART".
4. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN TECHNOLOGIES IS ENCOUNTERED, THE CONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
5. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
6. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
7. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
8. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE NEW TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING NOTES

SCALE: N.T.S. | 3



CABLE COLOR CODING DIAGRAM

SCALE: N.T.S. | 4

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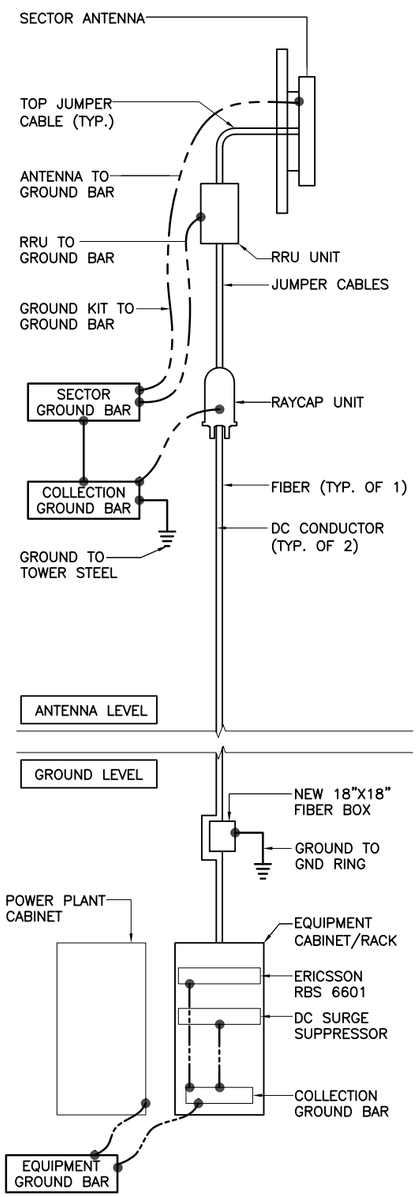
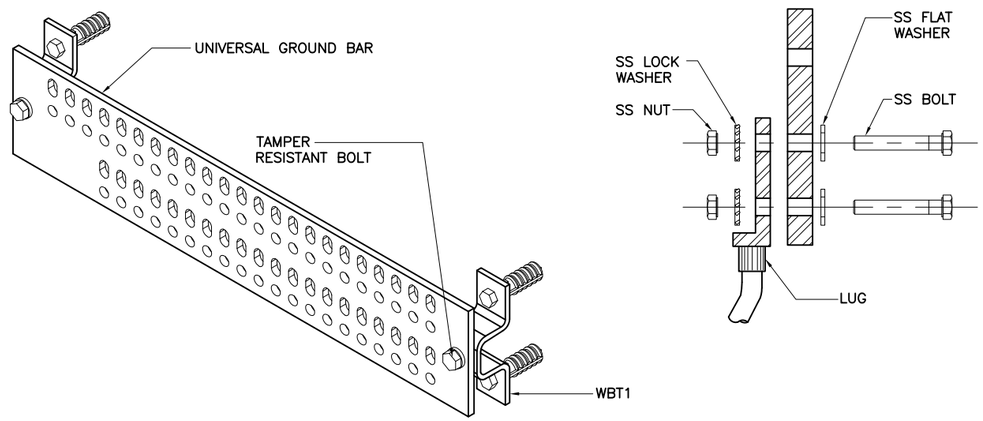
SHEET NAME
CABLE NOTES AND COLOR CODING

SHEET NUMBER
A7

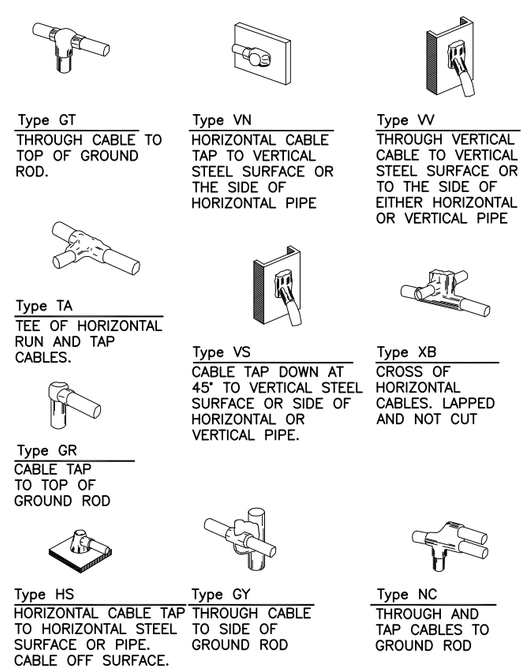
PROJECT# 2020.0032.0029



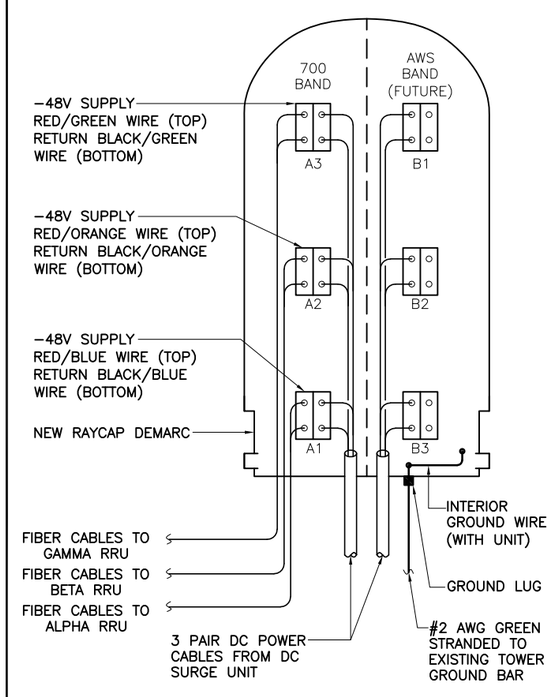
GROUNDING SCHEMATIC SCALE: N.T.S. 1



GROUND BAR DETAIL SCALE: N.T.S. 2



EXOTHERMIC WELD DETAILS SCALE: N.T.S. 3



RAYCAP DC POWER DETAIL SCALE: N.T.S. 4

NOT USED SCALE: N.T.S. 5

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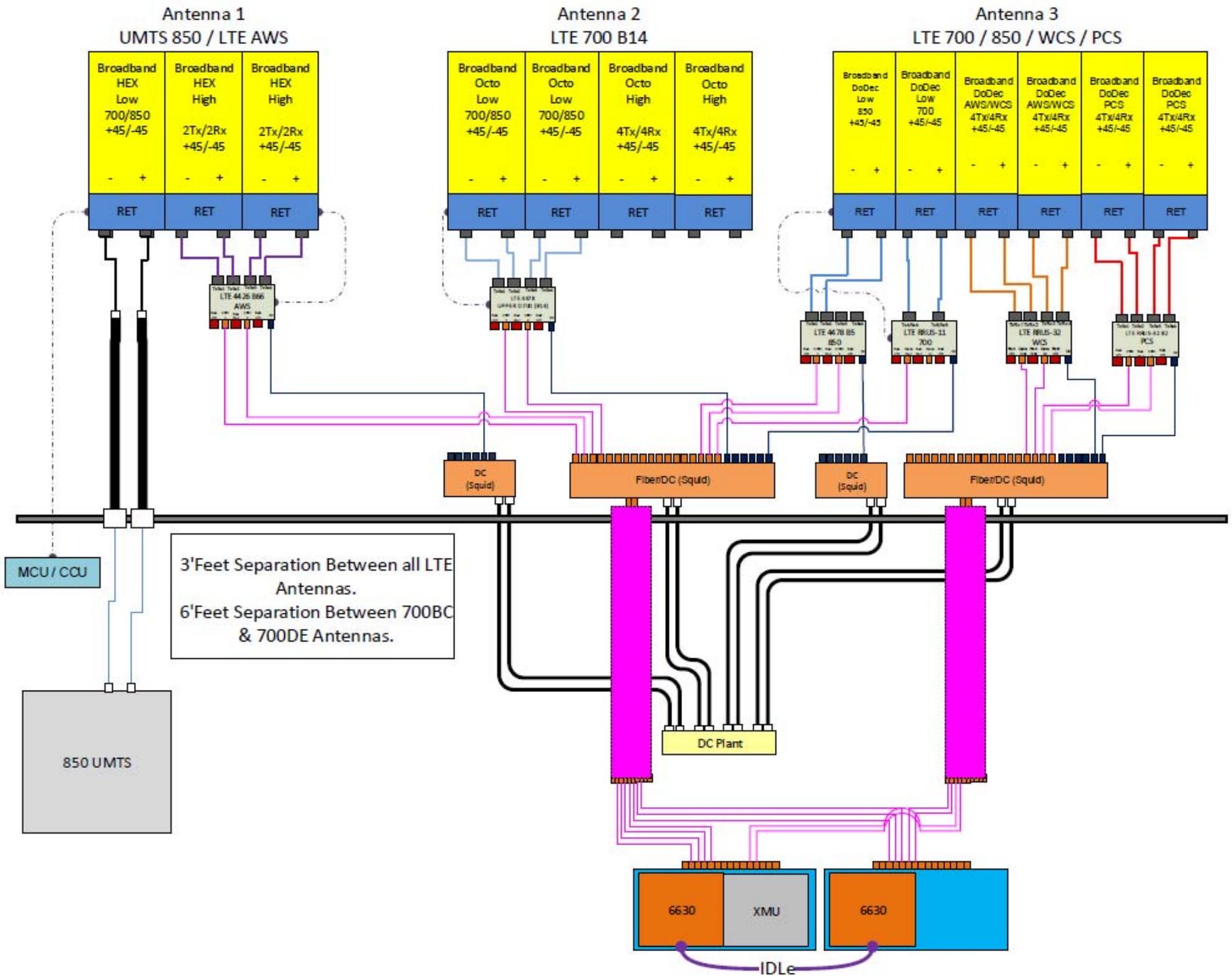

*BASED ON RFDS V1.0, DATED (3/27/20)

PLUMBING DIAGRAMS

SCALE: N.T.S. | 1

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