June 3, 2022

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:	**200 Oronoque Lane Stratford, CT 06614**
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 twelve (12) wireless telecommunication antennas at an antenna center line height of 121-feet on an existing 150'-foot Monopole, owned by the Town of Stratford at 2725 Main St, Stratford, CT 06615.

AT&T desires to modify its existing telecommunications facility by swapping nine (9) existing antennas with (9) new antennas, swapping six (6) existing remote radio units with (6) new remote radion units and adding associated cables. The centerline height of said antennas is and will remain at 121' 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. § 16-5l0j-72(b) (2). In accordance with R.C.S.A., a copy of this letter is being sent to The Honorable Laura R. Hoydick, Mayor, Town of Stratford at 2725 Main Street, Stratford, CT 06615, Daniel Brennan, Zoning Enforcement Officer, Town of Stratford at 2725 Main Street, Stratford, CT 06615 and Brian Donovan, Building Official, Town of Stratford at 2725 Main Street, Stratford, CT 06615.

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

EM-AT&T-138-1901424 – New Cingular Wireless, PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 200 Oronoque Lane Stratford, Connecticut 06614.

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 121-foot level of the 150-foot Monopole.
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,

Carolyn Seeley
Real Estate Project Manager
Smartlink on behalf of AT&T
(978) 760-5577
Carolyn.seeley@smartlinkgroup.com

CC w/enclosures
The Honorable Laura R. Hoydick, Mayor, Town of Stratford
Daniel Brennan, Zoning Enforcement Officer, Town of Stratford
Brian Donovan, Building Official, Town of Stratford

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 27, 2014

Christopher B. Fisher, Esq.
Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, NY 10601

RE: **TS-CING-138-140509 -** New Cingular Wireless PCS, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 200 Oronoque Lane, Stratford, Connecticut.

Dear Attorney Fisher:

At a public meeting held June 26, 2014, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures with the following conditions:

- Any deviation from the proposed installation as specified in the original tower share request and supporting materials with the Council shall render this decision invalid;
- Any material changes to the proposed installation as specified in the original tower share request and supporting materials filed with the Council shall require an explicit request for modification to the Council pursuant to Connecticut General Statutes § 16-50aa, including all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65;
- Not less than 45 days after completion of the proposed installation, the Council shall be notified in writing that the installation has been completed;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by New Cingular Wireless PCS, LLC shall be removed within 60 days of the date the antenna ceased to function.
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

This decision is under the exclusive jurisdiction of the Council and applies only to this request for tower sharing dated May 1, 2014. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower. Any deviation from the approved tower sharing request is enforceable under the provisions of Connecticut General Statutes § 16-50u.

The proposed shared use is to be implemented as specified in your letter dated May 1, 2014, including the placement of all necessary equipment and shelters within the tower compound.

Please be advised that the validity of this action shall expire one year from the date of this letter.

Thank you for your attention and cooperation.

Very truly yours,

Robert Stein MAB

Robert Stein
Chairman

RS/DM/cm

c: The Honorable John A. Harkins, Mayor, Town of Stratford
Gary Lorentson, Planning & Zoning Administrator

200 ORONOQUE LN

Location	200 ORONOQUE LN	**Mblu**	60/20 2/ 1/ /
Acct#	1289400	**Owner**	TOWN OF STRATFORD
PBN		**Assessment**	$772,170
Appraisal	$1,103,100	**PID**	13349
Building Count	1	**Sewer Use**	BZZ
EPA Action			

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$775,300	$327,800	$1,103,100

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$542,710	$229,460	$772,170

Owner of Record

Owner	TOWN OF STRATFORD	**Sale Price**	$30,000
Co-Owner	FIRE HOUSE	**Certificate**	
Address	200 ORONOQUE LN STRATFORD, CT 06614-1357	**Book**	0493
		Page	0583
		Sale Date	07/23/1974

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Sale Date**	**Book**	**Page**
TOWN OF STRATFORD	$30,000		07/23/1974	0493	0583
POWELL EFFIE V	$0		03/27/1973	0460	1124

Building Information

Building 1 : Section 1

Building Photo

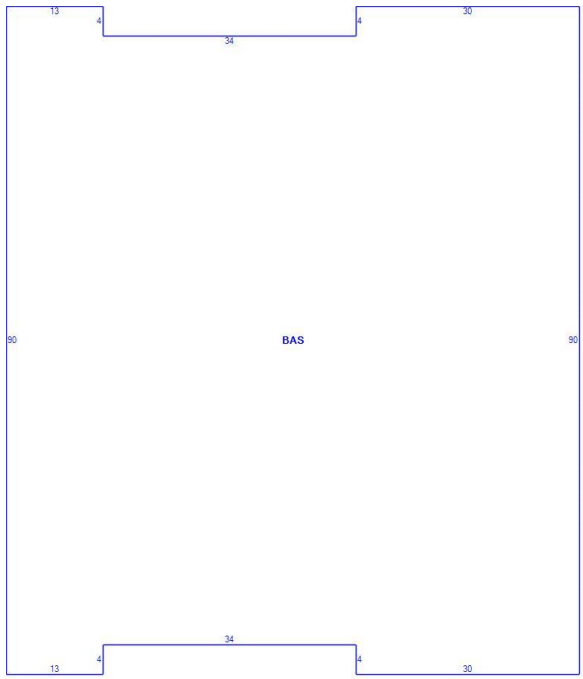
Year Built: 1978
Living Area: 6,658
Building Percent Good: 78

Building Attributes	
Field	**Description**
Style:	Fire Station
Model	Commercial
Grade	B-
Stories:	1 Story
Occupancy	1.00
Exterior Wall 1	Cedar or Redwd
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	Fire Dept
1st Floor Use:	932
Heat/AC	Heat/AC Split
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil & Min WL
Rooms/Prtns	Average
Wall Height	16.00
% Comm Wall	

Building Photo

Building Photo
(https://images.vgsi.com/photos/StratfordCTPhotos///0089/IMG_5405_896

Building Layout



(ParcelSketch.ashx?pid=13349&bid=13349)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	6,658	6,658
		6,658	6,658

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 932

Land Line Valuation

Size (Acres) 0.98

Description	Fire Dept	**Frontage**	0
Zone	RS-1	**Depth**	0
Neighborhood	100	**Assessed Value**	$229,460
Alt Land Appr	No	**Appraised Value**	$327,800
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV	Paving	AS	Asphalt	3000.00 S.F.	$2,500	1
SHD1	Shed	CF	ConBlk\Frm	180.00 S.F.	$3,100	1
ANTG	Guyed Tower	R	Radio	100.00 L.F.	$12,800	1
LT1	Lights in with pole			6.00 Units	$8,600	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$775,300	$327,800	$1,103,100
2020	$775,300	$327,800	$1,103,100
2019	$775,300	$327,800	$1,103,100

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2021	$542,710	$229,460	$772,170
2020	$542,710	$229,460	$772,170
2019	$542,710	$229,460	$772,170

Town of Stratford

Map Title

Legend

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

283.9 0 141.95 283.9 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

METROCOG
Connecticut Metropolitan Council of Governments

Radio Frequency Safety Survey Report Predictive (RFSSRP) Prepared For AT&T

Site Name:	STRATFORD ORONOQUE ROAD
FA#	10152336
USID:	163489
Site ID:	CTL02638
Address:	200 ORONOQUE LANE STRATFORD, CT 06614
County:	FAIRFIELD
Latitude:	41.2514110
Longitude:	-73.1171510
Structure Type:	MONOPOLE
Property Owner:	NA
Pace job:	MRCTB054248
RFDS technology:	5G NR 1SR CBAND

Report Information

Report Writer: Sunita Sati

Report Generated Date: 05-20-2022

Compliance Statement

AT&T Mobility Compliance Statement: Based on the information collected, AT&T Mobility will be Compliant when the remediation recommended in section 5 or appropriate remediation determined by AT&T is implemented

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1. Executive Summary

1.1 Site Summary

Max Predictive Spatial Average MPE% & Location on Site (General Public)	271926.0% on Antennas Centerline Level & at AT&T Sec-A antenna no. #A3-2
Max Predictive Spatial Average MPE% at Ground Level (General Public)	1.4%
AT&T Mobility Site Compliance	AT&T Mobility will be Compliant by implementing remediation recommended as per section 5 in this report.

TABLE 1: Site Summary

1.2 Signage Summary (Proposed)

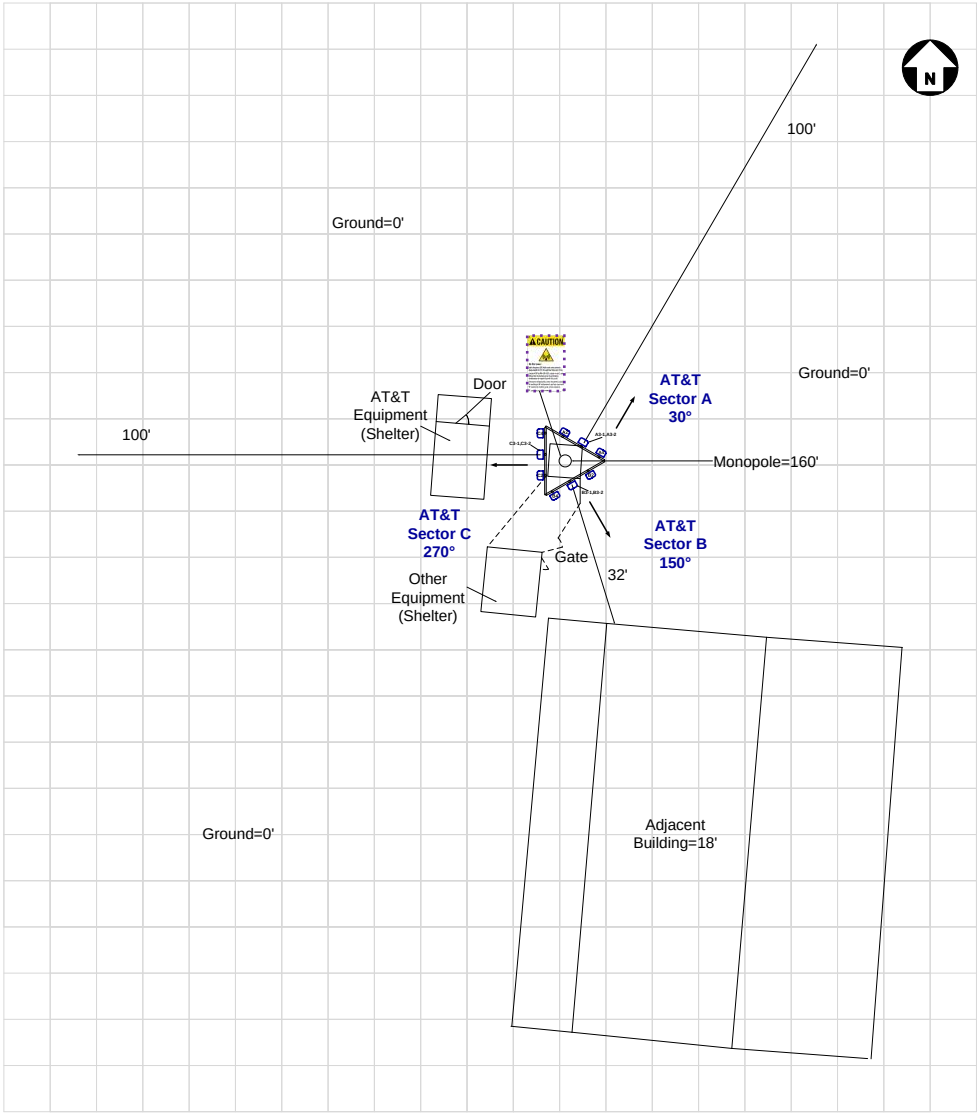
AT&T Signage Locations	Sign Type									
	Safety Instructions	Notice Sign 2	Caution Sign 2	Caution Sign 2B	Caution Sign 2C	Caution 7"x7"	Warning Sign 1B	RF Exposure Map	Lock	Barriers
Access Point(s)				1						
Alpha										
Beta										
Gamma										

TABLE 2: Signage Summary (Proposed)

1.3 List of Documents used to prepare this Report

- *10152336_AE201_220428_CTL02638_REV0*
- *NEW-ENGLAND_CONNECTICUT_CT2638_2021-5G-NR-Radio_5G-NR-1SR-CBAND_pn5165_2051A11PJ8_10152336_163489_11-06-2021_Final-Approved_v2.00*

2. Site Scale Map



AT&T Antenna	Proposed	Proposed Signage									
Panel	Barrier	Safety Instructions	Notice 2	Caution 2	Caution 2B	Caution 2C	Caution 7"x7"	Warning 1B	RF Exposure Map	Lock	***Map Scale = 10 ft***
OMNI	Posts										

3. Antenna Inventory

Ant ID	Operator	Antenna Mfg	Antenna Model	Antenna Type	FREQ. (MHz)	TECH.	AZ. (0)	HBW (0)	Antenna Gain (dBd)	Antenna Aperture (ft)	Transmitter Power (Watts)	Total Loss (dB)	Total ERP (Watts)	Total EIRP (Watts)
A2	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	30	73	13.45	8	120.00	0.5	2366.91	3883.12
A2	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	30	66	15.95	8	120.00	0.5	4209.02	6905.28
A2	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	30	66	16.15	8	120.00	0.5	4407.39	7230.72
A3-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	30	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
A3-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	30	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
A4	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	30	75	12.95	8	120.00	0.5	2109.51	3460.84
A4	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	30	64	13.85	8	120.00	0.5	2595.26	4257.76
A4	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	30	64	15.95	8	75.00	0.5	2630.64	4315.80
B2	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	150	73	13.45	8	120.00	0.5	2366.91	3883.12
B2	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	150	66	15.95	8	120.00	0.5	4209.02	6905.28
B2	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	150	66	16.15	8	120.00	0.5	4407.39	7230.72
B3-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	150	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
B3-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	150	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
B4	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	150	75	12.95	8	120.00	0.5	2109.51	3460.84
B4	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	150	64	13.85	8	120.00	0.5	2595.26	4257.76
B4	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	150	64	15.95	8	75.00	0.5	2630.64	4315.80
C2	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	270	73	13.45	8	120.00	0.5	2366.91	3883.12
C2	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	270	66	15.95	8	120.00	0.5	4209.02	6905.28
C2	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	270	66	16.15	8	120.00	0.5	4407.39	7230.72
C3-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	270	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
C3-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	270	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
C4	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	270	75	12.95	8	120.00	0.5	2109.51	3460.84
C4	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	270	64	13.85	8	120.00	0.5	2595.26	4257.76
C4	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	270	64	15.95	8	75.00	0.5	2630.64	4315.80

Table 3.1: Antenna Inventory Table

Note: **^ Mechanical Tilt value of "0°" MUST be retained for C-BAND and/or DoD AAS antenna(s) at all times to ensure that "EME (Predictive) Study" shall remain valid.**
* 75% TDD duty Cycle, 1.5dB Power Tolerance & 0.32 Power Reduction factor[1] are used to calculate Transmitter Power & ERP/EiRP

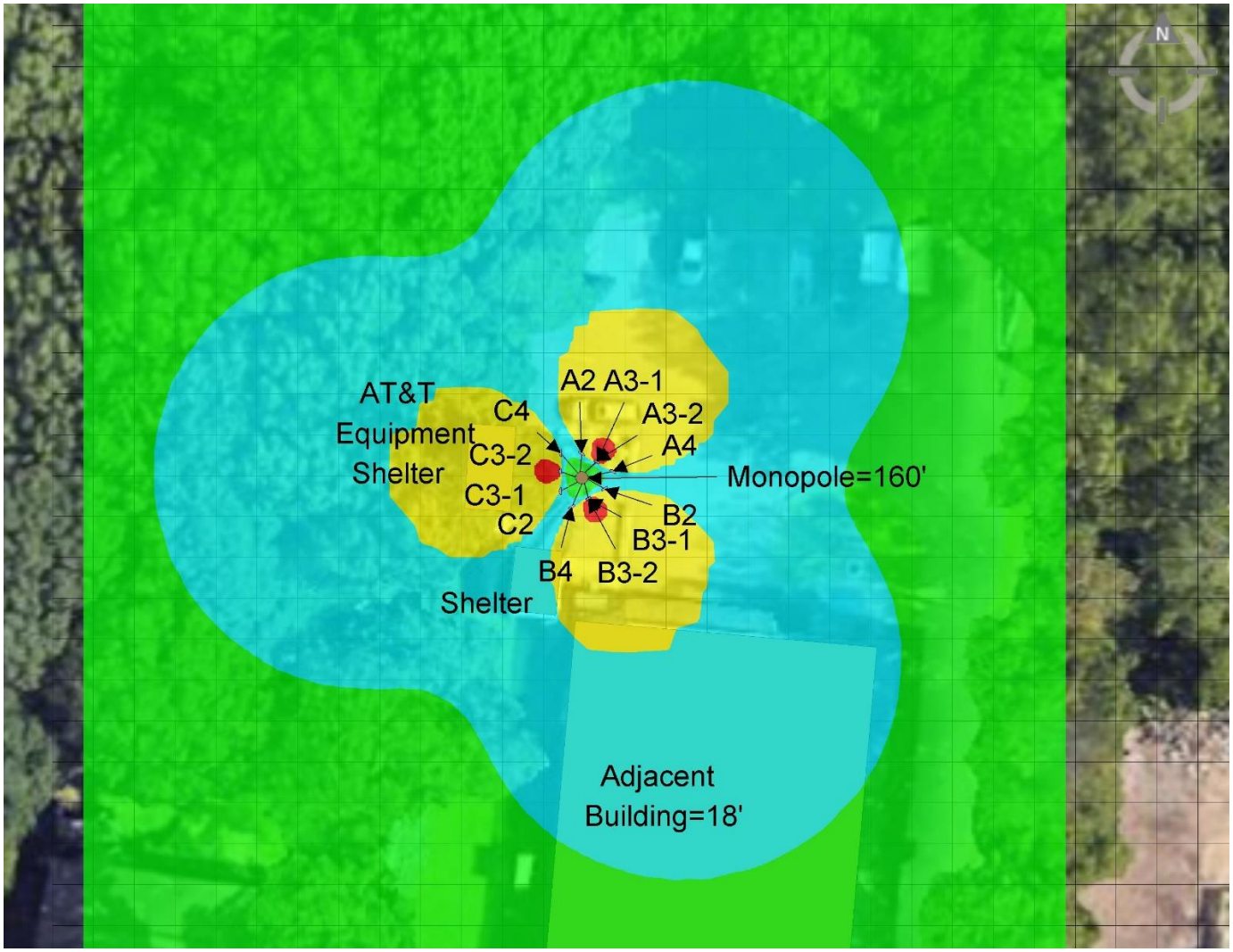
Antenna Heights (Z)

Ant ID	Operator	Antenna Radiation Centerline	Z-Height from Adj. Bldg	Z-Height from Ground
A2	AT&T	121.00	99.00	117.00
A3-1	AT&T	122.77	103.50	121.50
A3-2	AT&T	119.22	99.95	117.95
A4	AT&T	121.00	99.00	117.00
B2	AT&T	121.00	99.00	117.00
B3-1	AT&T	122.77	103.50	121.50
B3-2	AT&T	119.22	99.95	117.95
B4	AT&T	121.00	99.00	117.00
C2	AT&T	121.00	99.00	117.00
C3-1	AT&T	122.77	103.50	121.50
C3-2	AT&T	119.22	99.95	117.95
C4	AT&T	121.00	99.00	117.00

Table 3.2: Antenna Height(s) Summary Table

4. Predicted Emission

4.1 Predictive Cumulative MPE Contribution from All Sources at Antennas Centerline Level (121 ft.)



Max. Predictive Spatial Average MPE% = **271926.0%**

Proposed Barrier
Proposed Posts

% of FCC General Public Exposure Limit (Predictive Spatial Average)

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Map Scale = 10 ft

4.2 Predictive Cumulative MPE Contribution from All Sources at Adjacent Building Level (18 ft.)

Max. Predictive Spatial Average MPE% = **2.0 %**

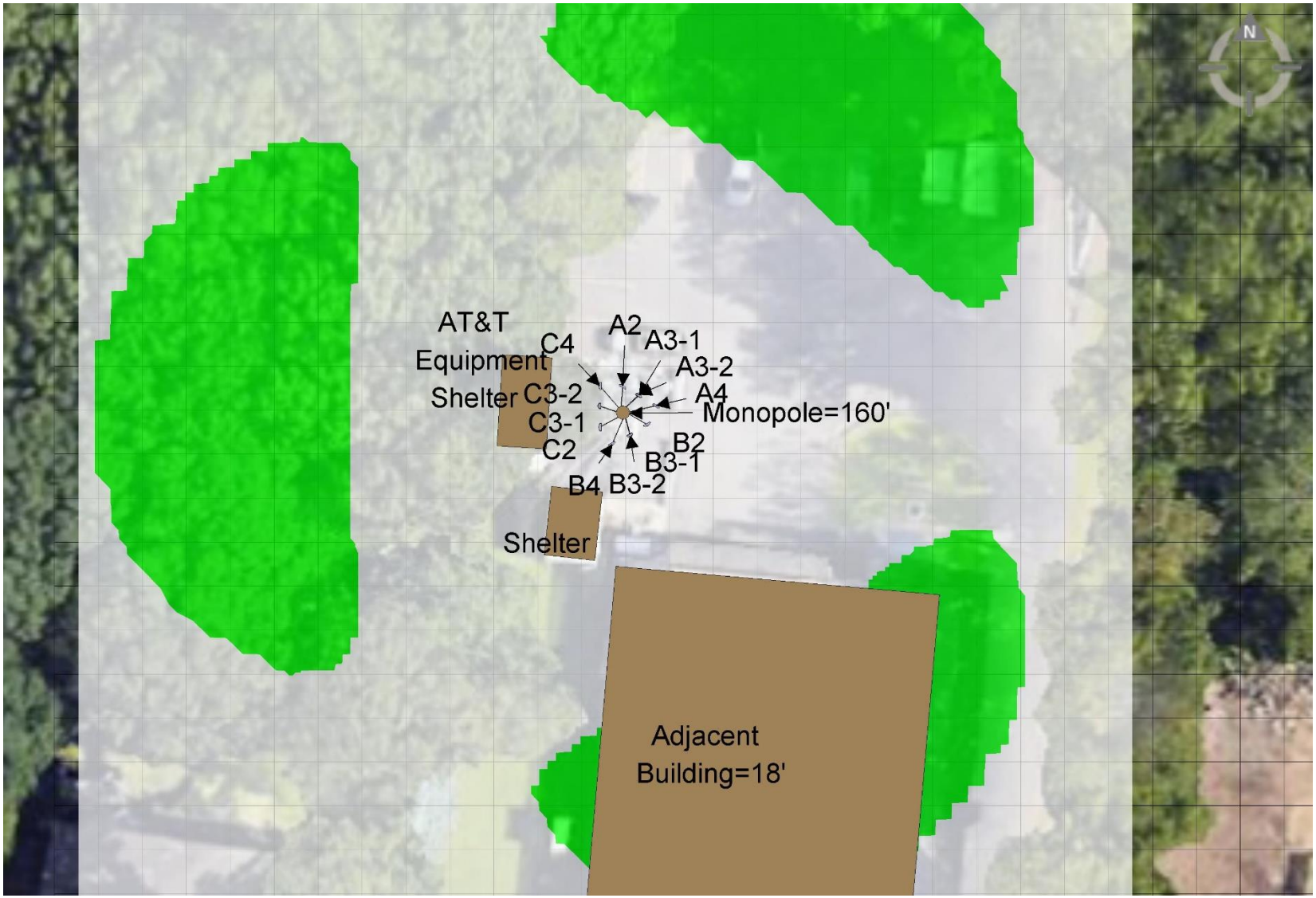
Proposed Barrier
Proposed Posts

% of FCC General Public Exposure Limit (Predictive Spatial Average)

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Map Scale = 10 ft

4.3 Predictive Cumulative MPE Contribution from All Sources at Ground Level (0 ft.)



Max. Predictive Spatial Average MPE% = **1.4%**

Proposed Barrier
Proposed Posts

% of FCC General Public Exposure Limit (Predictive Spatial Average)

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Map Scale = 10 ft

5. Statement of Compliance

5.1 Statement of AT&T Mobility Compliance

At the time of our Analysis, AT&T Mobility is required to take action to fulfill their Obligations to comply with the FCC's mandate as defined in OET-65

Recommendations

AT&T Alpha Sector:

- No Action Required.

AT&T Beta Sector:

- No Action Required.

AT&T Gamma Sector:

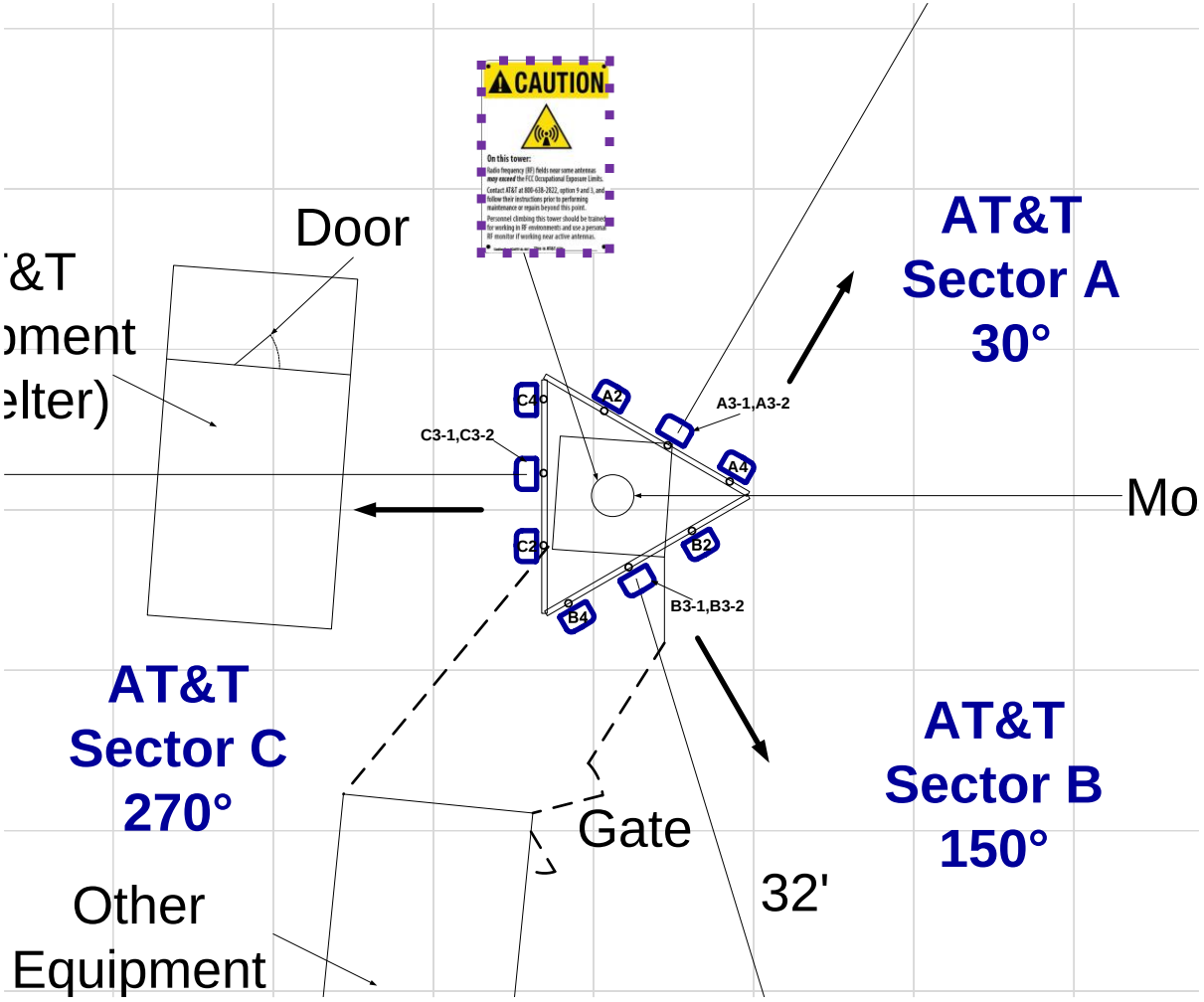
- No Action Required.

Monopole:

- One Caution 2B Sign to be posted on the Monopole at climbing access, facing outwards so approaching people can see as shown in "Recommendations Map – Detailed View" on page 11. (1 Total Sign)

Recommendations Map – Detailed View

AT&T Alpha, Beta & Gamma Sectors



AT&T Antenna		Proposed		Proposed Signage									Map Scale = 10 ft
				Safety Instructions	Notice 2	Caution 2	Caution 2B	Caution 2C	Caution 7"x7"	Warning 1B	RF Exposure Map	Lock	
	Panel	Barrier											
	OMNI	Posts											

Appendix A – Statement of Limiting Conditions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at full power at all times. AT&T has further recommended to assume a 75% duty cycle of maximum radiated power for all LTE & 5G carriers (& consider 100% duty cycle for all UMTS carriers).

In this site compliance report, it is assumed that Mechanical Tilt value of "0°" MUST be retained for C-BAND and/or DoD AAS^ antenna(s) at all times to ensure that "EME (Predictive) Study" shall remain valid.

AT&T recommended to consider - For C-BAND and/or DoD AAS^ antenna(s) 75% TDD duty Cycle, 1.5dB Power Tolerance & 0.32 Power Reduction factor[1] are used to calculate Transmitter Power & ERP/EiRP.

AT&T recommended to use worst-case tilts for the simulations.

*[1] **Power Reduction Factor**: IEC Standard 62232: 2017 allows for a statistically conservative power density model to more realistically define the RF exposure area. AT&T recommends a "0.32" factor to calculate the "Actual Maximum" (time averaged) power value, which accounts for "Beam Scanning," "Scheduling," and "RBS Utilization" This recommended value is a conservative figure modelled and supported by other vendors and through measurements published in scientific articles and white papers by IEEE and others. Those publication are listed below:*

1. IEEE Access, Time-Averaged Realistic Maximum Power Levels for the Assessment of RF Exposure for 5G Radio Base Stations Using Massive MIMO (Published Sept. 18, 2017 / BJÖRN THORS, ANDERS FURUSKÄR, DAVIDE COLOMBI, AND CHRISTER TÖRNEVIK)
2. IEEE Explore, A Statistical Approach for RF Exposure Compliance Boundary Assessment in Massive MIMO Systems (Published Jan. 25, 2018 / Paolo Baracca, Andreas Weber, Thorsten Wild, Christophe Grangeat)
3. IEEE Access, In-situ Measurement Methodology for the Assessment of 5G NR Massive MIMO Base Station Exposure at Sub-6 GHz Frequencies (Published Dec. 20, 2019 / SAM AERTS, LEEN VERLOOCK, MATTHIAS VAN DEN BOSSCHE, DAVIDE COLOMBI, LUC MARTENS, CHRISTER TÖRNEVIK AND WOUT JOSEPH)
4. Applied Sciences, Analysis of the Actual Power and EMF Exposure from Base Stations in a Commercial 5G Network (Published July 30, 2020 / Davide Colombi, Paramananda Joshi, Bo Xu, Fatemeh Ghasemifard, Vignesh Narasaraju and Christer Törnevik)
5. Ofcom Technical Report, Electromagnetic Field (EMF) measurements near 5G mobile phone base stations (Published Feb. 21, 2020 / Davide Colombi, Paramananda Joshi, Bo Xu, Fatemeh Ghasemifard, Vignesh Narasaraju and Christer Törnevik)

MobileComm believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor). Thus, at any time, if power density measurements were made, we believe the real time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modelling in this way, MobileComm has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Other Carrier" 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, MobileComm will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. 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, MobileComm uses the closest frequency in the antenna's range that corresponds to the highest Maximum Exposure Limit (MPE), resulting in a conservative analysis.

Appendix B – FCC Guidelines and Emissions Threshold Limits

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (µW/cm2). The general population exposure limit for the 700 and 800 MHz Bands is approximately 467 µW/cm2 and 567 µW/cm2 respectively, and the general population exposure limit for the 1900 MHz PCS and 2100 MHz AWS bands is 1000 µW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure, have been properly trained in RF safety and can exercise control over their exposure. Occupational/Controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
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-I,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
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-I,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with FCC rules and regulations.

A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- *are exposed to RF energy as a consequence of their employment;*
- *have been made aware of the possibility of exposure; and*
- *can exercise control over their exposure.*

FCC guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

Appendix D – General Safety Recommendations

The following are general recommendations appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.

2. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:

- *adding new antennas that may have been located on the site*
- *removing of any existing antennas*
- *changes in the radiating power or number of RF emitters*

3. Post the appropriate SAFETY INSTRUCTIONS, NOTICE, CAUTION & WARNING sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in the report section above, to inform everyone who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. The signs below are examples of signs meeting FCC guidelines.

4. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.

5. For a General Public environment the five color levels identified in measured RF emission diagram can be interpreted in the following manner:

- *White represents areas predicted to be greater than or equal to 0% and less than 1% of the MPE general public limits*
- *Green represents areas predicted to be greater than or equal to 1% and less than 100% of the MPE general public limits*
- *Blue represents areas predicted to be greater than or equal to 100% and lesser than 500% of the MPE general public limits.*
- *Yellow represents areas predicted to be greater than or equal to 500% and lesser than 5000% of the MPE general public limits.*
- *Red areas indicates predicted levels greater than or equal to 5000% of the MPE general public limits.*

Appendix E – References

1 - FCC Definition

FCC defines an Occupational or Controlled environment as one where persons are exposed to RF fields 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. Typical criteria for an Occupational or Controlled environment is restricted access (i.e. locked doors, gates, etc.) to areas where antennas are located coupled with proper RF warning signage.

FCC defines a site as a General Public or Uncontrolled environment when human exposure to RF fields occurs to the general public or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over the exposure. Typical criteria for a General Public or Uncontrolled environment are unrestricted access (i.e. unlocked or no restrictions) to areas where antennas are located without proper RF warning signage being posted.

2 - Physical Testing measurement procedure and Tools

The Narda Broadband Field Meter NBM-550 can make rapid conformance measurements with evaluation in the time domain when used in conjunction EA5091 probe. This probe is a so-called Shaped Probe, i.e. it is frequency weighted so that it automatically takes account of the FCC Occupational limit values. To collect data, the probe is pointed towards the potential source(s) of EME radiation and moved slowly from ground level up to slightly above head height (approx. 6 ft).

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 an average sized human body will absorb while present in an electromagnetic field of energy.

3 - Site Safety 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 workers 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 locations (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.*

Rooftop RF Emissions Diagram: *Section 4 of this report contains an RF Emissions Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas on the rooftop. This analysis is all theoretical and assumes a duty cycle of 75% for each transmitting antenna at full power. This analysis is a worst case scenario. 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.*

4 - Definitions

Compliance- *The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation 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 75% 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, this product is divided by the cable losses*

Effective Radiated Power (ERP) – *In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.*

Gain (of an antenna in dbd) – *The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from a reference dipole. Gain is a measure of the relative efficiency of a directional antennas as compared to a reference dipole.*

General Population/Uncontrolled Environment – *Defined by the FCC, as an area where RFR exposure may occur to persons who are unaware of the potential for exposure and who have no control of 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, MobileComm will use our 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 Exposure Limit (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.*

Occupational/Controlled Environment – *Defined by the FCC, as an area where Radio Frequency Radiation (RFR) 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.*

Radio Frequency Radiation – *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 an average sized 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.*

Appendix F – Proprietary Statement

This report was prepared for the use of AT&T Mobility, LLC to meet requirements specified in AT&T's corporate RF safety guidelines. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by MobileComm are based solely on the information provided by AT&T Mobility and all observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to MobileComm so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

May 31, 2022

Scope:	**MOUNT ANALYSIS REPORT**
Prepared for:	SmartLink
Carrier:	AT&T
Site Number:	CTL02638
FA Number:	10152336
Site Name:	Stratford Oronoque Road
Site Address:	200 Oronoque Lane Stratford, CT 06614
Latitude/ Longitude:	41.2514110° / -73.1171510°
Structure Type:	MONOPOLE
Mount Type:	Existing Low-Profile Platform
Rad Center:	121'-0"

Fullerton Engineering P.C. is pleased to submit this "Mount Analysis Report" to determine the adequacy of the antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned structure.

Analysis Criteria:

Reference Standard:	TIA-222-H Standard	
Wind Parameters:	Basic Wind Speed:	119 mph (3-Sec gust)
	Ice Wind Speed:	50 mph (3-Sec gust)
	Design Ice Thickness:	1.00 in.
	Risk Category	II
	Exposure Category:	B
	Topographic Feature:	None
	Topographic Method:	Method 2
	Ground Elevation Factor, K_e:	0.99
Seismic Parameters:	S_s:	0.205
	S_1:	0.054
Analysis Software:	RISA-3D (V17)	

Appurtenance Loads:

The antenna mounting system was analyzed with the final loading configuration shown in Page 2 of this report.

Summary of Analysis Result: PASS (MAX STRESS RATIO = 85.8%)

Barbara T. Kotecki, P.E.

Summary:

This structural assessment is in regards to the adequacy of the antenna mounting system for the final loading configuration described below. The purpose was to determine conformance of the antenna mounting system under the applicable codes and standards.

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

This certification assumes that all structural members of the antenna mounting system 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.

Sources:

Reference Document	Date
RFDS Ver. 2.00 provided by AT&T	05/23/2022
Mount Mapping by FDH Infrastructure Services	04/11/2022
Construction Drawings by Fullerton Engineering P.C.	Latest Version

Final Loading Configuration:

Mount Elevation (ft)	Antenna Rad Center (Ft)	QTY.	MANUFACTURER	MODEL	Status
121'-0"	121'-0"	3	CCI	TPA65R-BU8DA-K	Proposed
		3	Ericsson	AIR 6449 B77D + AIR 6419 B77G Stacked	
		3	Ericsson	RRUS-4478 B14	
		3	Ericsson	RRUS-8843 B2/B66A	
		3	Kathrein	800-10966	Existing
		3	Ericsson	RRUS-4449 B5/B12	
		3	Ericsson	RRUS-32 B30	
		4	Raycap	DC6-48-60-18-8F	

Member Component Capacity Table:

Component	% Capacity	Pass / Fail
Face Horizontals	54.1%	Pass
Standoff Members	85.8%	Pass
Mounting Pipes	52.6%	Pass
Mount-to-Tower Connection, Collar Mount Threaded Rods	7.6%	Pass
Structural Rating (max from all components) = 85.8%		**PASS**

FULLERTON
NETWORK INTEGRITY STARTS HERE

Site Number: **CTL02638**
Site Name: STRATFORD ORONOQUE ROAD
Created By: GO
Checked By: BTK
Date: 5/27/2022
Code: ANSI/TIA-222-H

Base Structure Type	**Type**	Monopole	
Structure Height Above Grade (ft)	**Ht**	150.00	
RAD Center (ft)	**z**	121.00	
Windspeed no ice (mph, 3-sec gust)	**V**	119.00	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**	B	Section 2.6.5.1.2
Risk Category (I,II,III, IV)	**Cat**	II	Table 2-1
Topographic Feature	**K.1'**	None	Figure 2-1
Crest Height	**H**	5.00	Section 2.6.6.2.1
Length of Feature	**L**	5.00	
Distance from Crest to Tower	**x**	0.00	
Escarpment Downwind?		No	
Height above sea level	**Zs**	257.53	
Exposure Category Coefficient	**zg**	1200.00	Table 2-4
Mid-Point of Structure	**Ht.mid**	75.00	
Min Velocity Pressure Coefficient	**Kzmin**	0.70	Table 2-4
Exposure Category Coefficient	**α'**	7.00	Table 2-4
Velocity Pressure Coefficient	**Kz**	1.04	Section 2.6.5.2
Ground Elevation Factor	**Ke**	0.99	Section 2.6.8
Topographic Feature Factor Adjusted for Slope	**K1**	1.00	Figure 2-1
Horizontal Distance Factor	**K2**	1.00	Figure 2-1
Vertical Distance Factor	**K3**	0.00	Figure 2-1
Topographic Factor	**Kzt**	1.00	Section 2.6.6.2.1
Rooftop Wind Speed-Up Factor	**Ks**	1.00	Section 2.6.7
Ice Load Importance Factor	**Iti**	1.00	Table 2-3
Wind Direction Probability Factor	**Kd**	0.95	Table 2-2
Height Escalation Factor	**Kiz**	1.14	Section 2.6.10
Gust Effect Factor	**Gh**	1.00	Section 16.6
Design Ice Thickness	**tiz**	1.14	Section 2.6.10
Ice Density	**ρ.ice**	56.00	lbf/ft^3
Velocity Pressure for Maintenance	**qzm**	2.26	Section 2.6.11.6
Velocity Pressure With Ice	**qzi**	6.29	Section 2.6.11.6
Velocity Pressure No Ice	**qz**	35.61	Section 2.6.11.6

Ka= 0.9

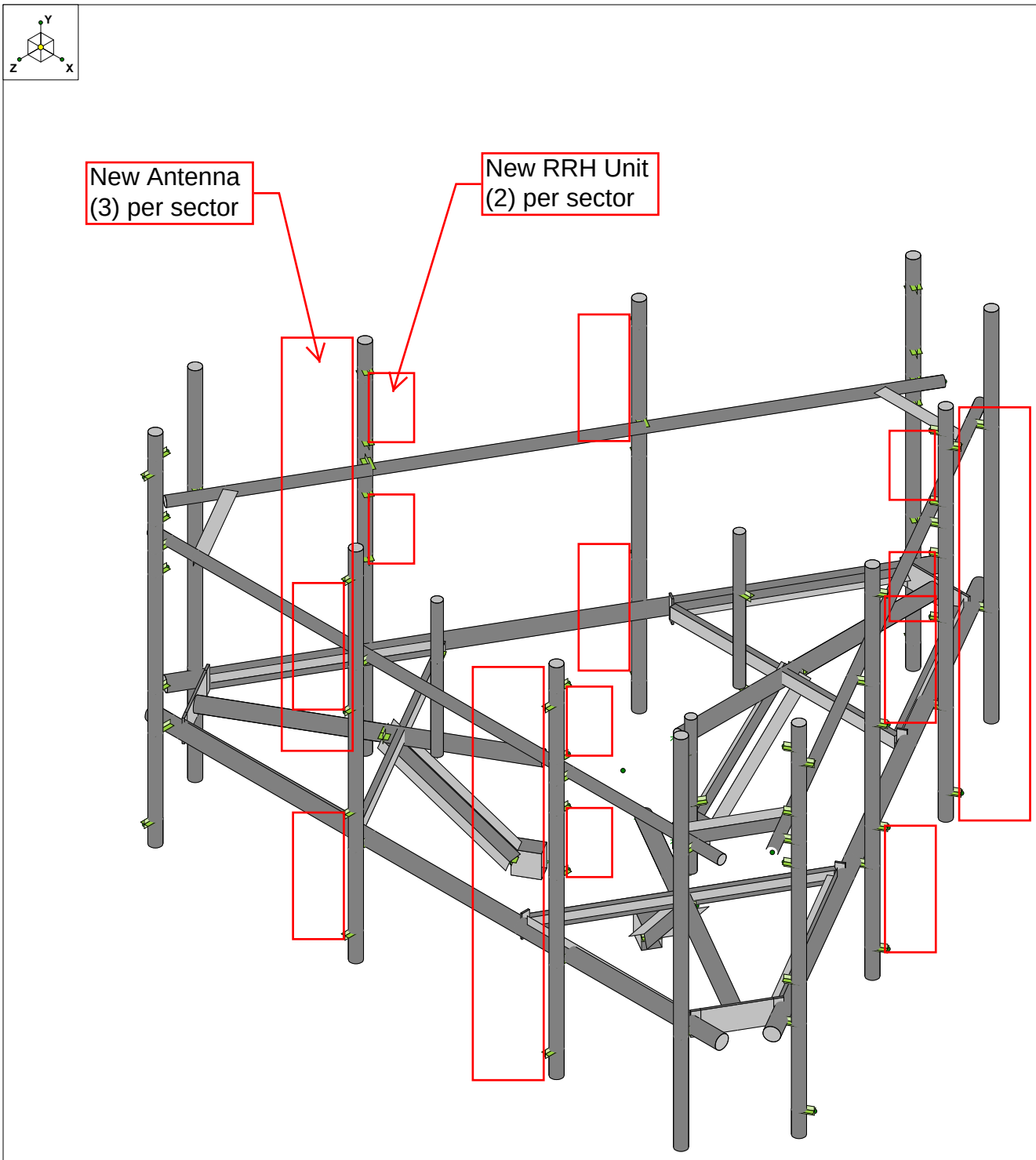
Importance Factor (Earthquake)	I_e	1.00	Table 2-3
Site Class	**Class**	D - Default	
Seismic Design Category	**Cat**	B	
MCE_R Ground Motion (period=0.2s)	S_S	0.205	
MCE_R Ground Motion (period=1.0s)	S_1	0.054	
Seismic Design Value at 0.2s	S_{DS}	0.218	
Long-Period Site Coefficient Fv	**Fv**	0.80	Table 2-12
Seismic Design Value at 1.0s	S_{D1}	0.029	Sec. 2.7.5
Long-period Transition Period (s)	T_L	6	

Sesimic Shear		
R	2.000	See 16.7
$C_{s\text{-calc}}$	0.109	See 2.7.7.1.1
$C_{s\text{-min}}$	0.010	See 2.7.7.1.1
C_S	0.109	See 2.7.7.1.1
A_S	1.000	See 16.7

Rooftop Wind Speed-Up Factor	Ks	No	
Horizontal distance from windward face to center of structure	Xb (ft)	1	Section 2.6.7
Width of windward face of the building	Ws (ft)	100	Section 2.6.7
Height of the parapet wall	Hp (ft)	5	Section 2.6.7
Height of windward face of the building	Hs (ft)	150.00	Section 2.6.7
Height of structure above roof	Zr (ft)	10.00	Section 2.6.7
	H1 (ft)	5.2	Section 2.6.7
	H2 (ft)	105.00	Section 2.6.7

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**
Kathrein	800-10966	Flat	96	20	6.9	114.6	2	57.3	52.8	278	120	55	27	18	8	6	2	17
Ericsson	AIR 6449 B77D	Flat	30.4	15.9	8.1	81.6	2	40.8	21.3	65	34	14	8	4	2	4	2	4
Ericsson	AIR 6419 B77G	Flat	28.3	16.1	7.9	77	2	38.5	19.9	61	31	13	7	4	2	4	2	4
CCIAntennas	TPA65R-BU8DA-K	Flat	96	20.7	7.7	87.1	2	43.6	57.5	286	130	57	29	18	8	5	2	18
Ericsson	RRUS-4478 B14	Flat	16.5	13.4	7.7	44	2	22.0	13.0	30	17	7	4	2	1	2	1	2
Ericsson	RRUS-8843 B2/B66A	Flat	15	13.2	11.1	75	2	37.5	16.4	26	22	6	5	2	1	4	2	2
Ericsson	RRUS-4449 B5/B12	Flat	15	13.2	9.3	70	2	35.0	14.2	26	19	6	5	2	1	4	2	2
Ericsson	RRUS-32 B30	Flat	27.2	12.1	7	60	2	30.0	16.6	44	27	10	7	3	2	3	1	3
Raycap	DC6-48-60-18-8F	Round	24	9.7	9.7	32.8	1	32.8	15.1	26	26	6	6	2	2	4	1	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**
Pipe	Pipe 3 Std.	Round	153.5	3.5	3.5	7.58	12.7917	96.96	6.5	11	11	3	3	0.7	0.7	0.8	0.3	4
Pipe	Pipe 2 Std.	Round	153.5	2.38	2.38	3.66	12.7917	46.82	4.9	8	8	3	3	0.5	0.5	0.4	0.2	3
Pipe	Pipe 2½ Std.	Round	96	2.88	2.88	5.80	8	46.40	5.6	9	9	3	3	0.6	0.6	1	0.3	2
Pipe	Pipe 3 Std.	Round	68.64	3.5	3.5	7.58	5.72	43.36	6.5	10	10	3	3	1	1	1	0.3	2
Angle	L3x3x¼	Flat	34.8	3	3	4.90	2.9	14.21	7.5	12	12	4	4	1	1	1	0.2	1
Angle	L2x2x3/16	Flat	46.5	2	2	2.44	3.875	9.46	5.5	10	10	3	3	1	1	0.3	0.1	1
HSS	HSS6x4x¼	Flat	6	6	4	15.62	0.5	7.81	11.6	19	13	6	5	1	1	2	0.7	0.3
Pipe	Pipe 2 Std.	Round	36	2.38	2.38	3.66	3	10.98	4.9	6	6	2	2	0.4	0.4	0.4	0.2	1
Channel	C3x3.5	Flat	60.39	3	1.37	3.50	5.0325	17.61	6.2	15	7	4	3	1	0.5	0.4	0.2	2
Plate	PL¼"x6"	Flat	14.5	6	0.5	10.21	1.20833	12.34	10.0	19	3	5	2	1	0.2	1	0.4	1
Angle	L3x3x3/8	Flat	21.9	3	3	7.20	1.825	13.14	7.5	11	11	4	4	1	1	1	0.3	1



Envelope Only Solution

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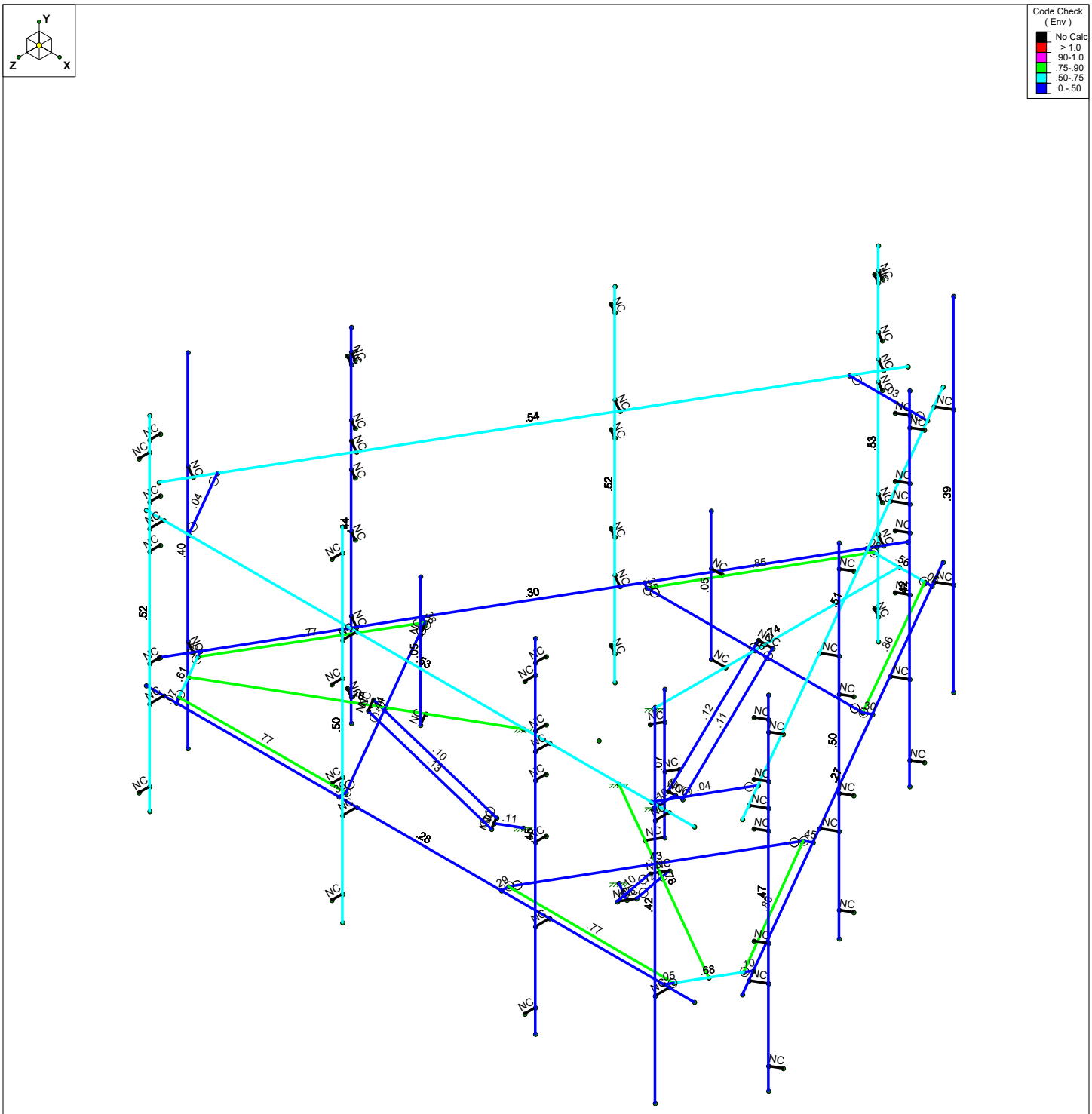

Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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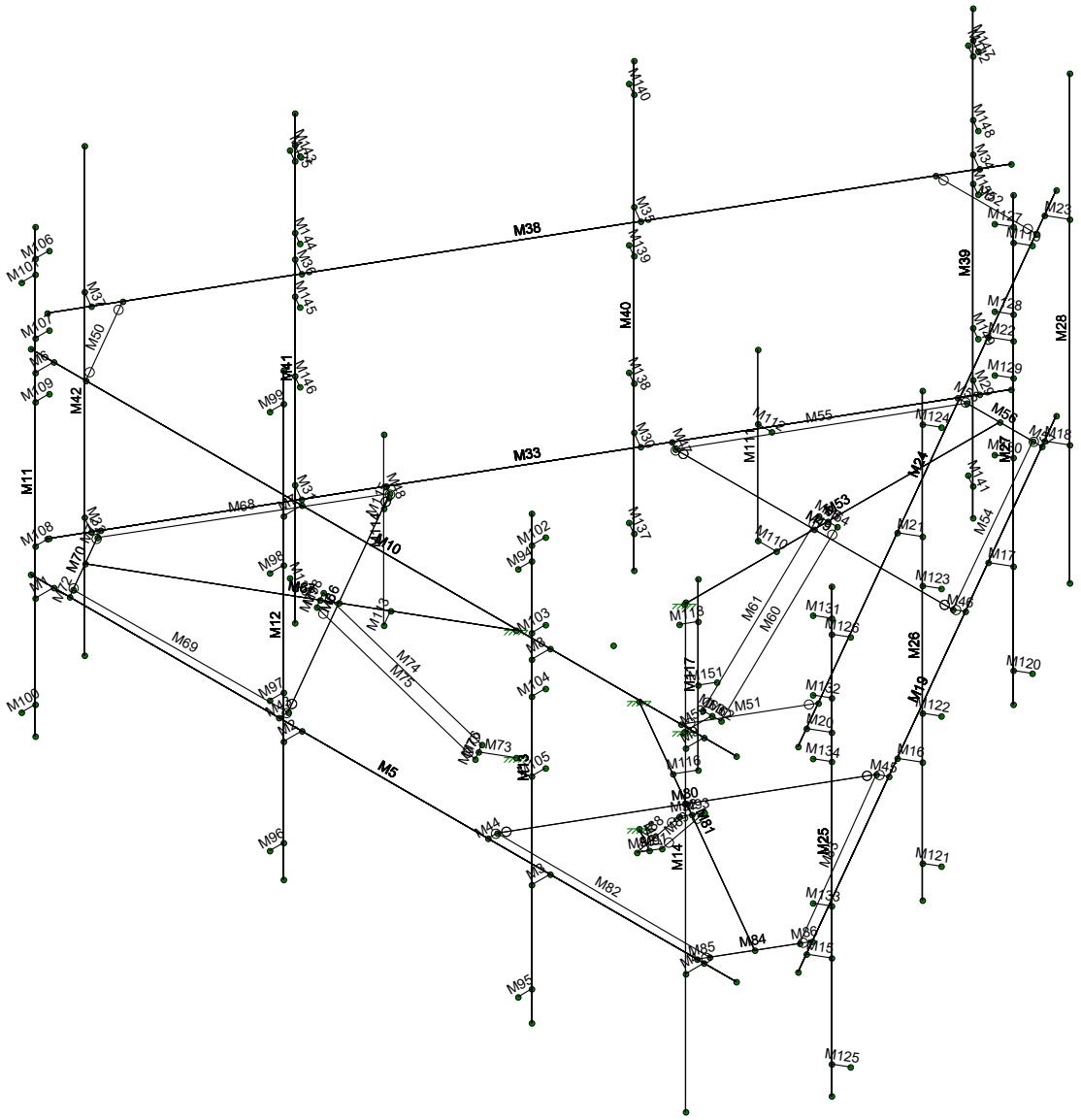

Envelope Only Solution

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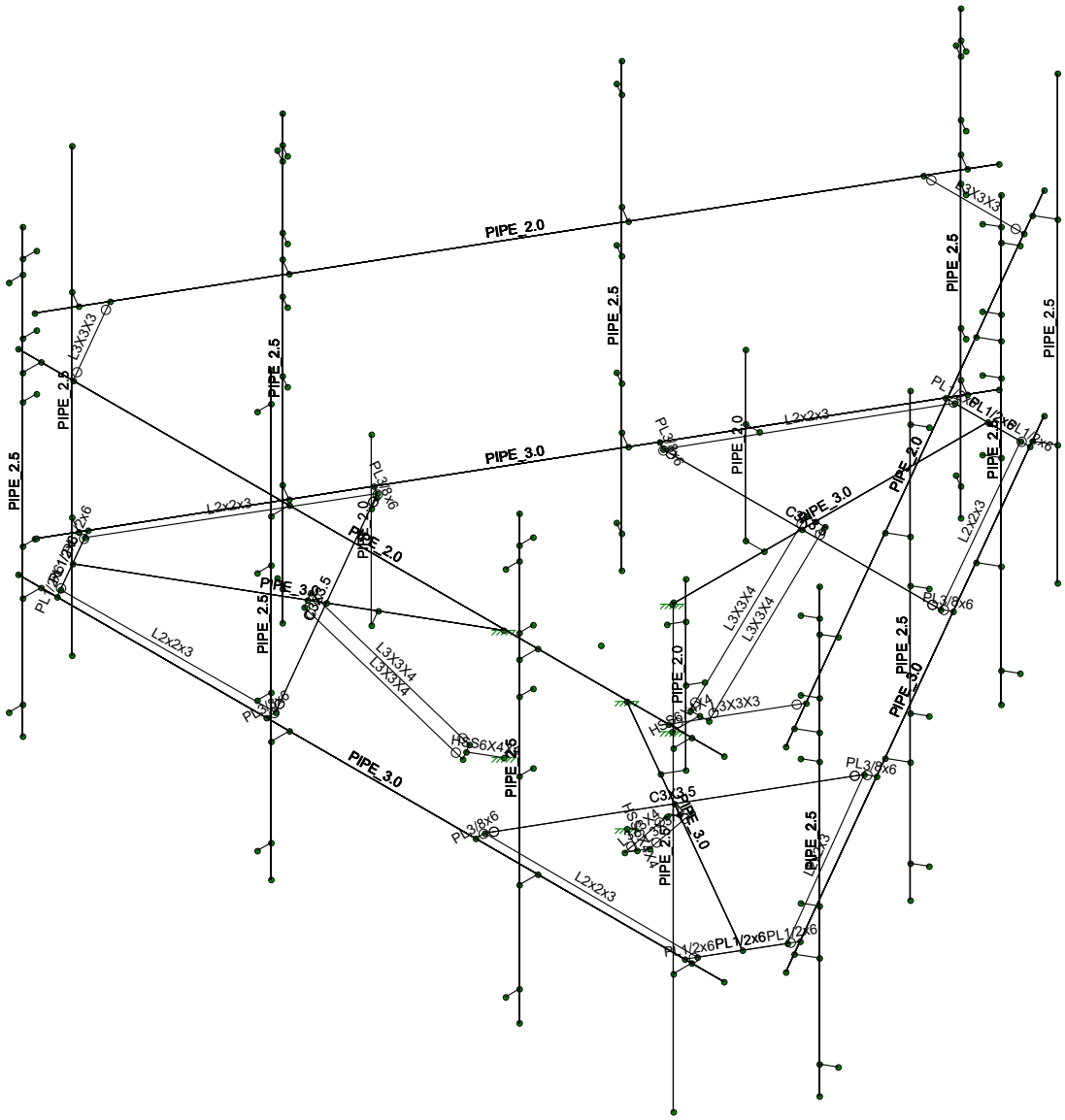

Envelope Only Solution

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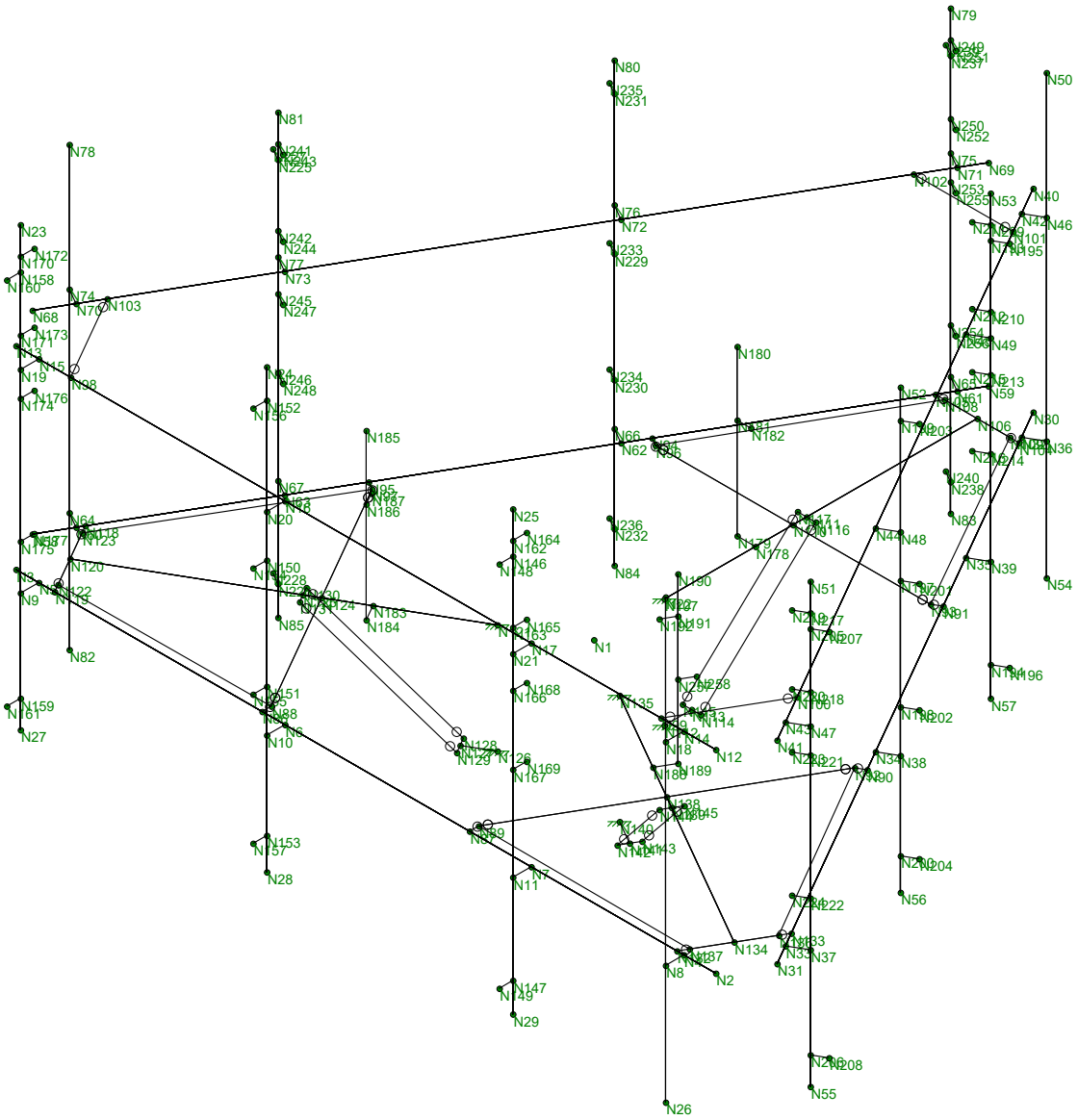
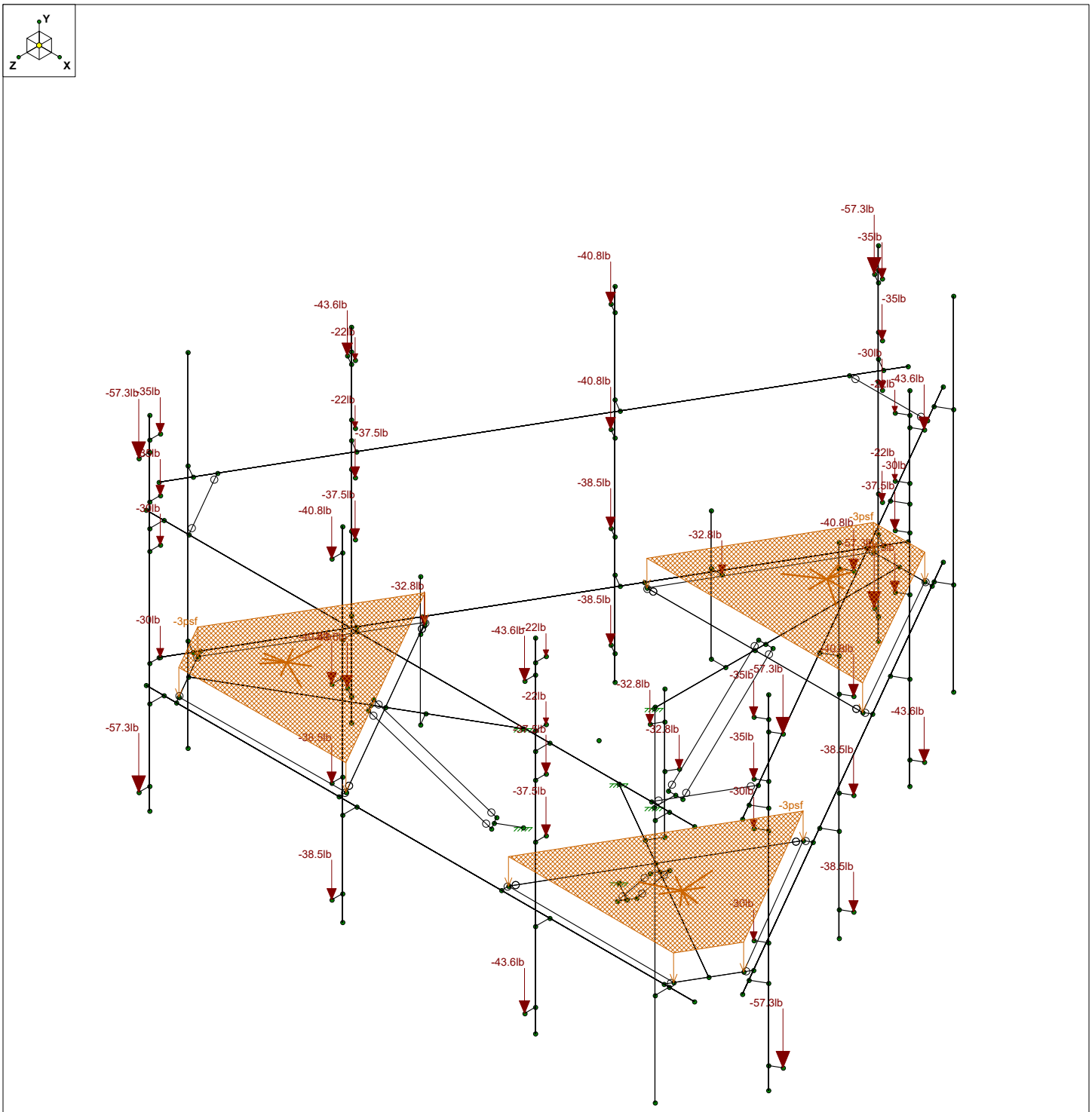
GO	Mount Analysis	May 27, 2022 at 1:03 PM
CTL02638	Shape	CTL02638-Mount Analysis - Rev H...



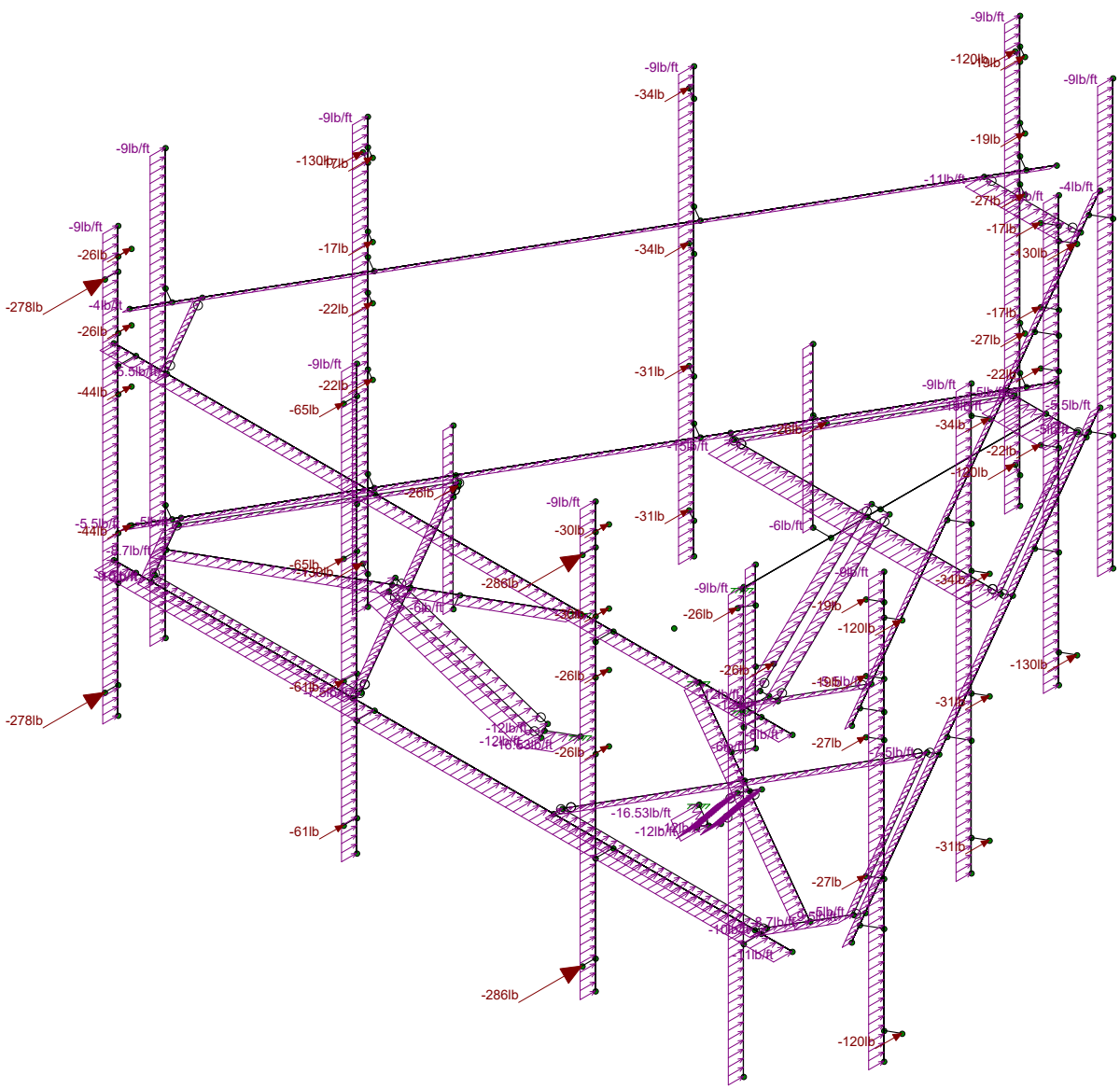
Envelope Only Solution

Fullerton Engineering P.C.		SK - 5
GO	Mount Analysis	May 27, 2022 at 1:04 PM
CTL02638	Nodes	CTL02638-Mount Analysis - Rev H...



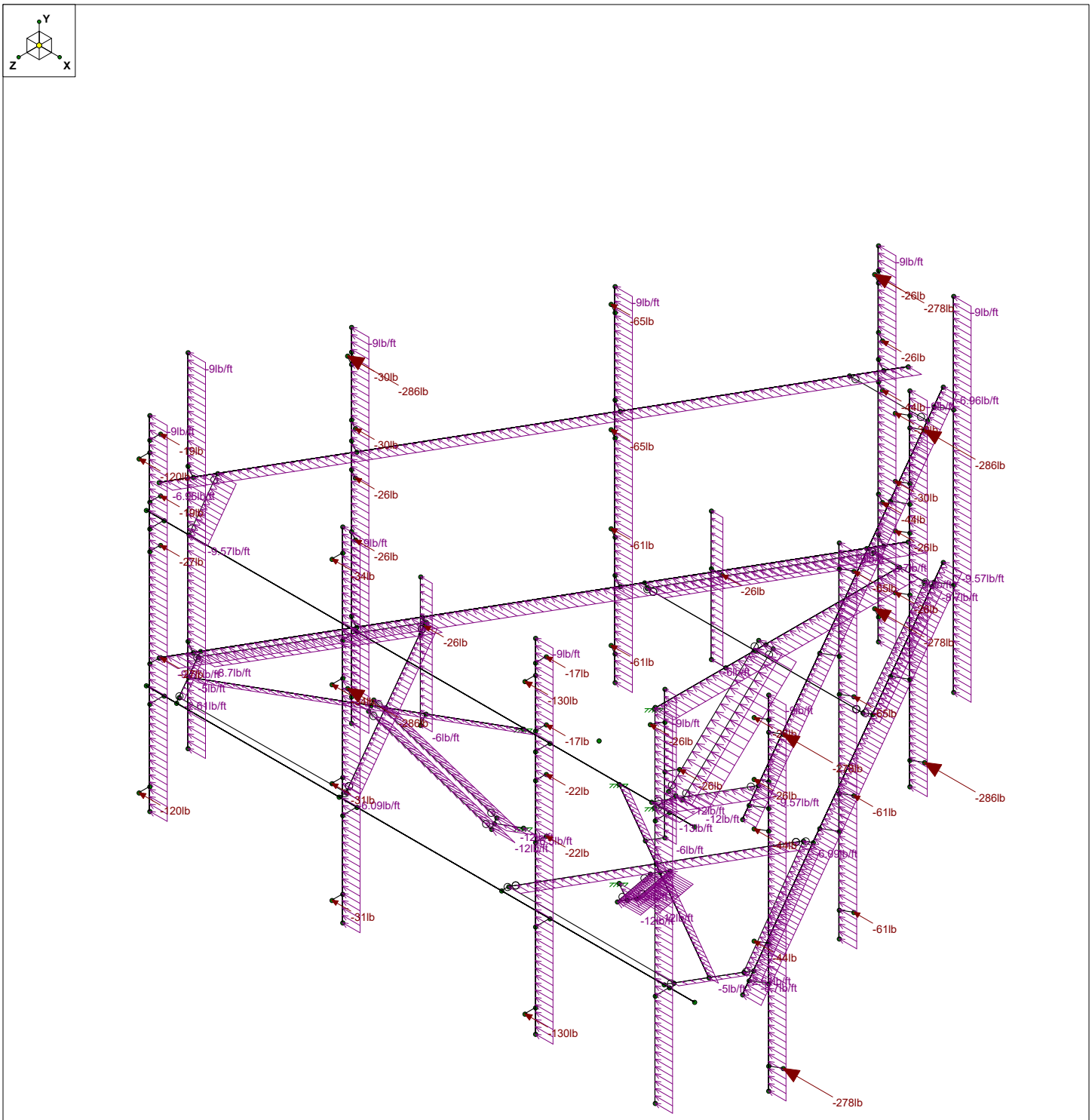
Loads: BLC 1, DL
Envelope Only Solution

Fullerton Engineering P.C.		SK - 6
GO	Mount Analysis	May 27, 2022 at 1:04 PM
CTL02638	Dead Load	CTL02638-Mount Analysis - Rev H...



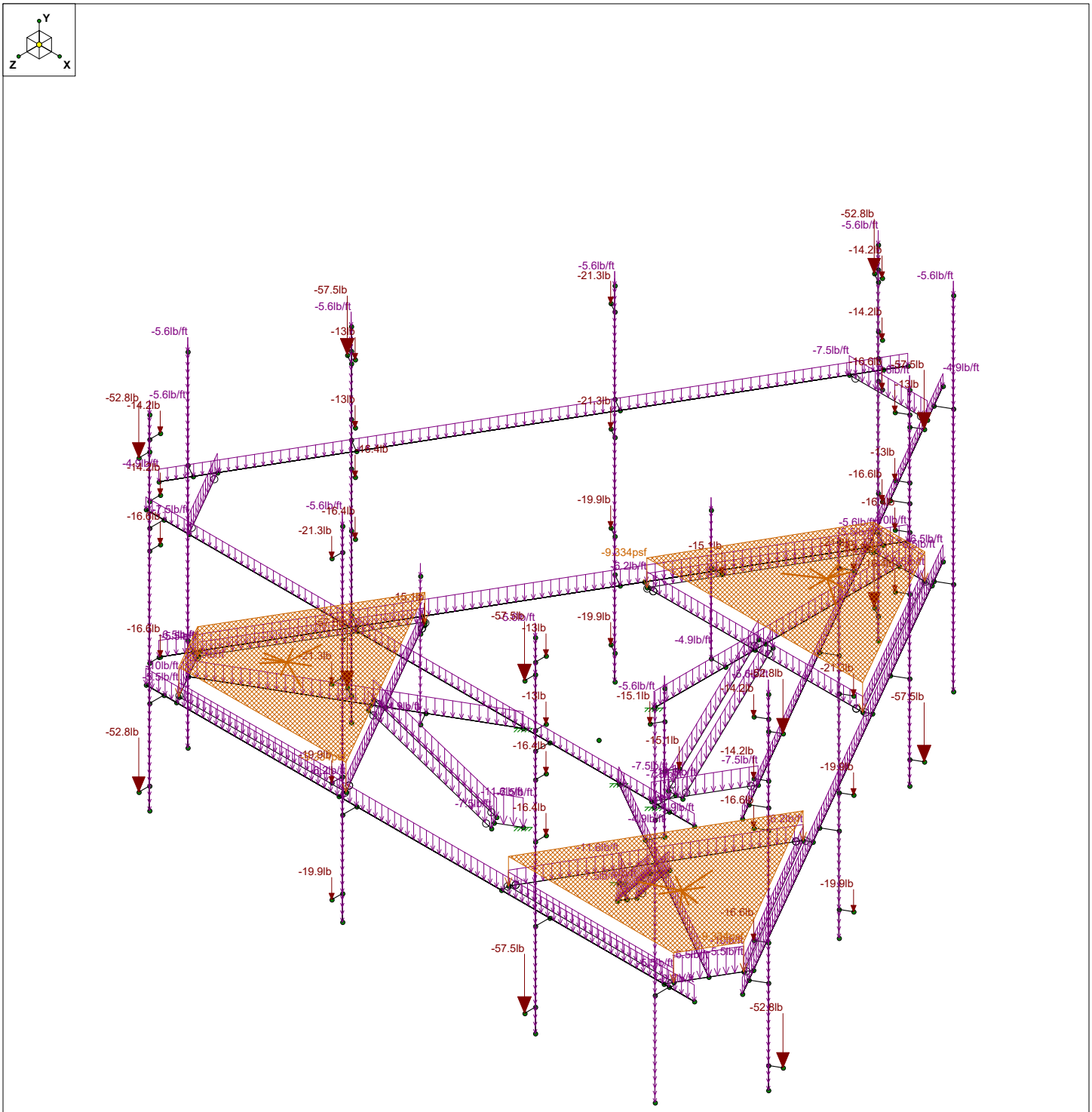
Loads: BLC 3, WL(0)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 7
GO	Mount Analysis	May 27, 2022 at 1:04 PM
CTL02638	Wind Load (Z-Direction)	CTL02638-Mount Analysis - Rev H...



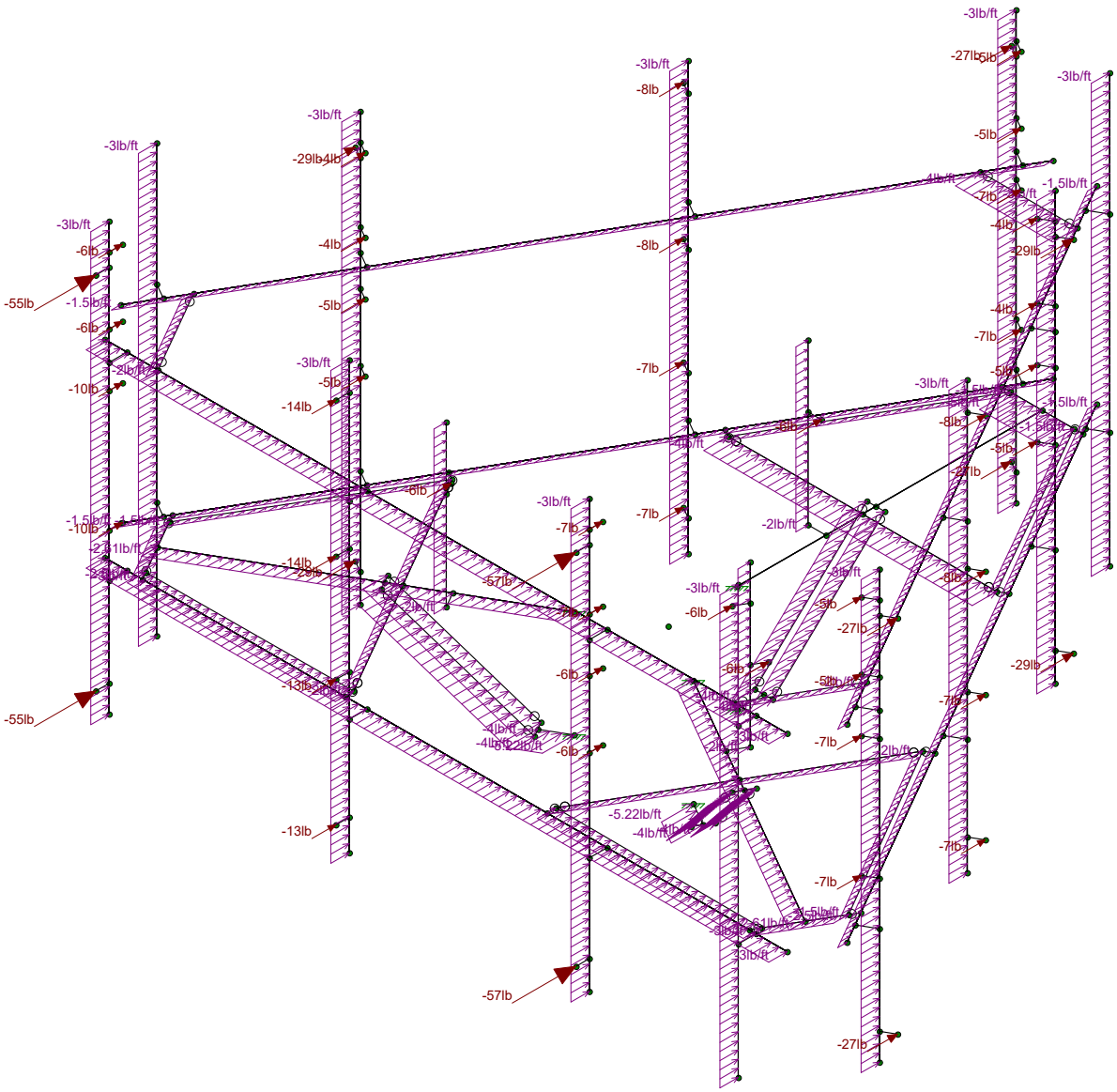
Loads: BLC 4, WL(90)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 8
GO	Mount Analysis	May 27, 2022 at 1:05 PM
CTL02638	Wind Load (X-Direction)	CTL02638-Mount Analysis - Rev H...



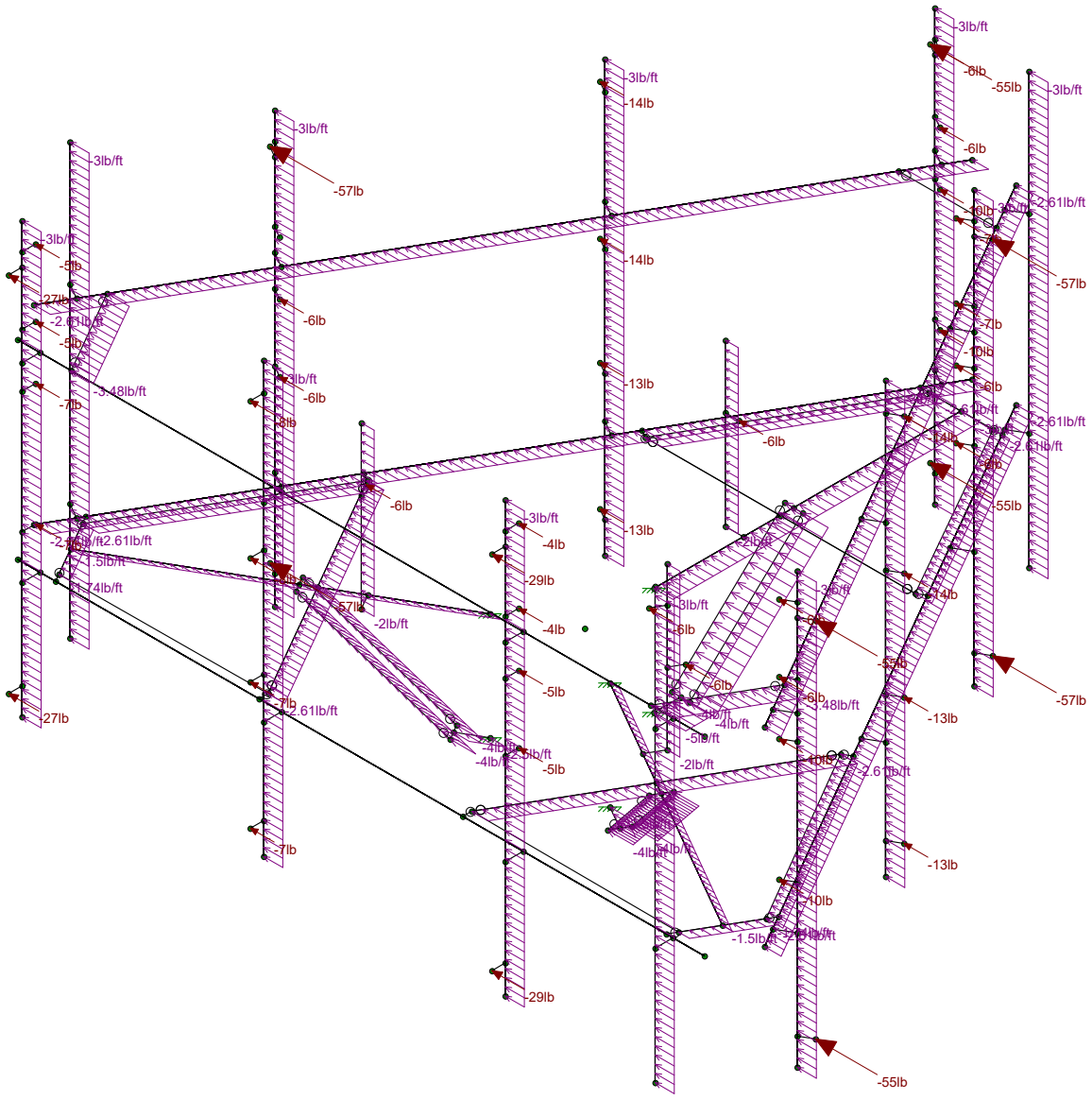
Loads: BLC 2, DLi
Envelope Only Solution

Fullerton Engineering P.C.		SK - 9
GO	Mount Analysis	May 27, 2022 at 1:05 PM
CTL02638	Ice Load	CTL02638-Mount Analysis - Rev H...



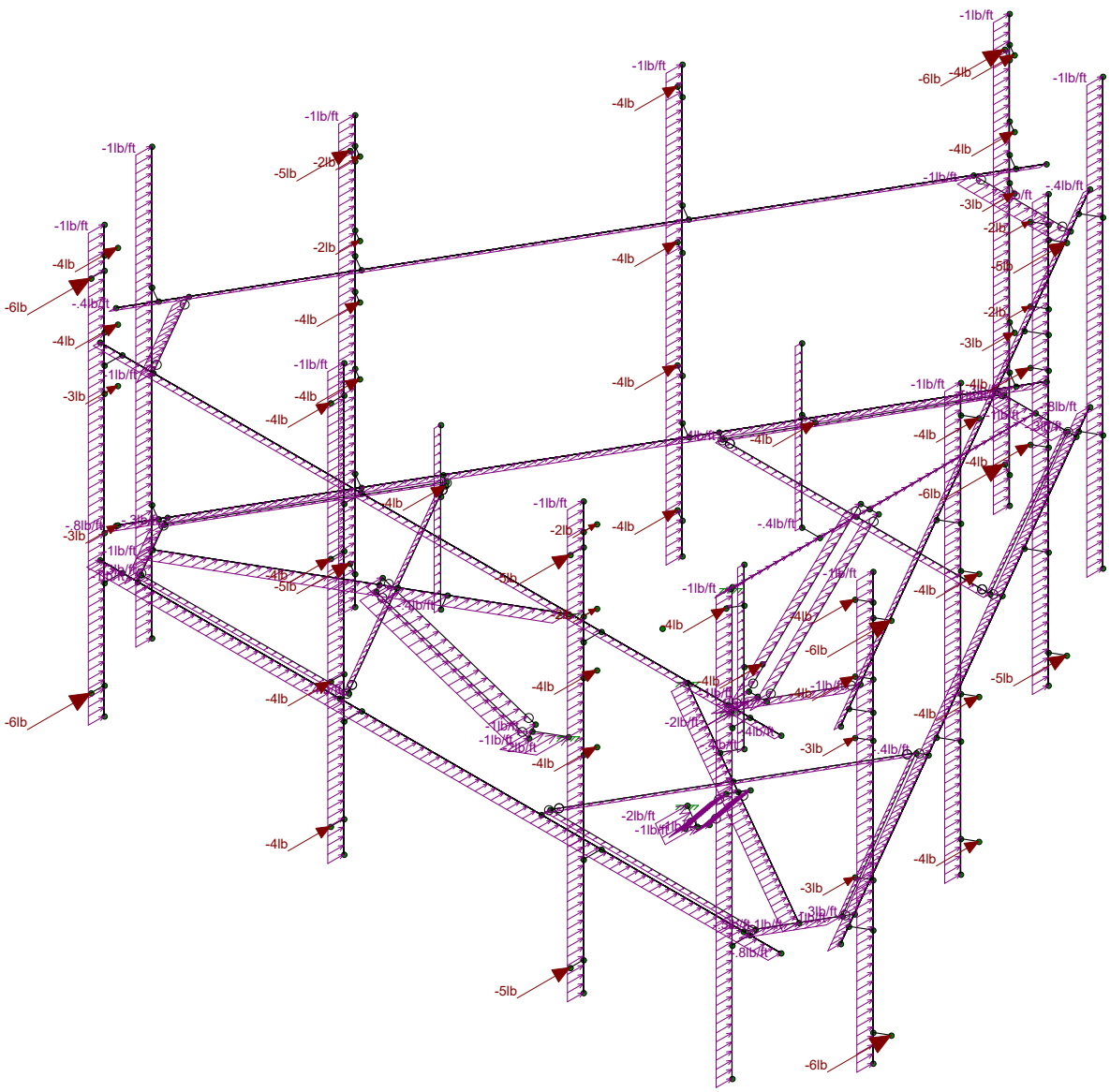
Loads: BLC 5, WL.i(0)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 10
GO	Mount Analysis	May 27, 2022 at 1:05 PM
CTL02638	Wind Load with Ice (Z-Direction)	CTL02638-Mount Analysis - Rev H...



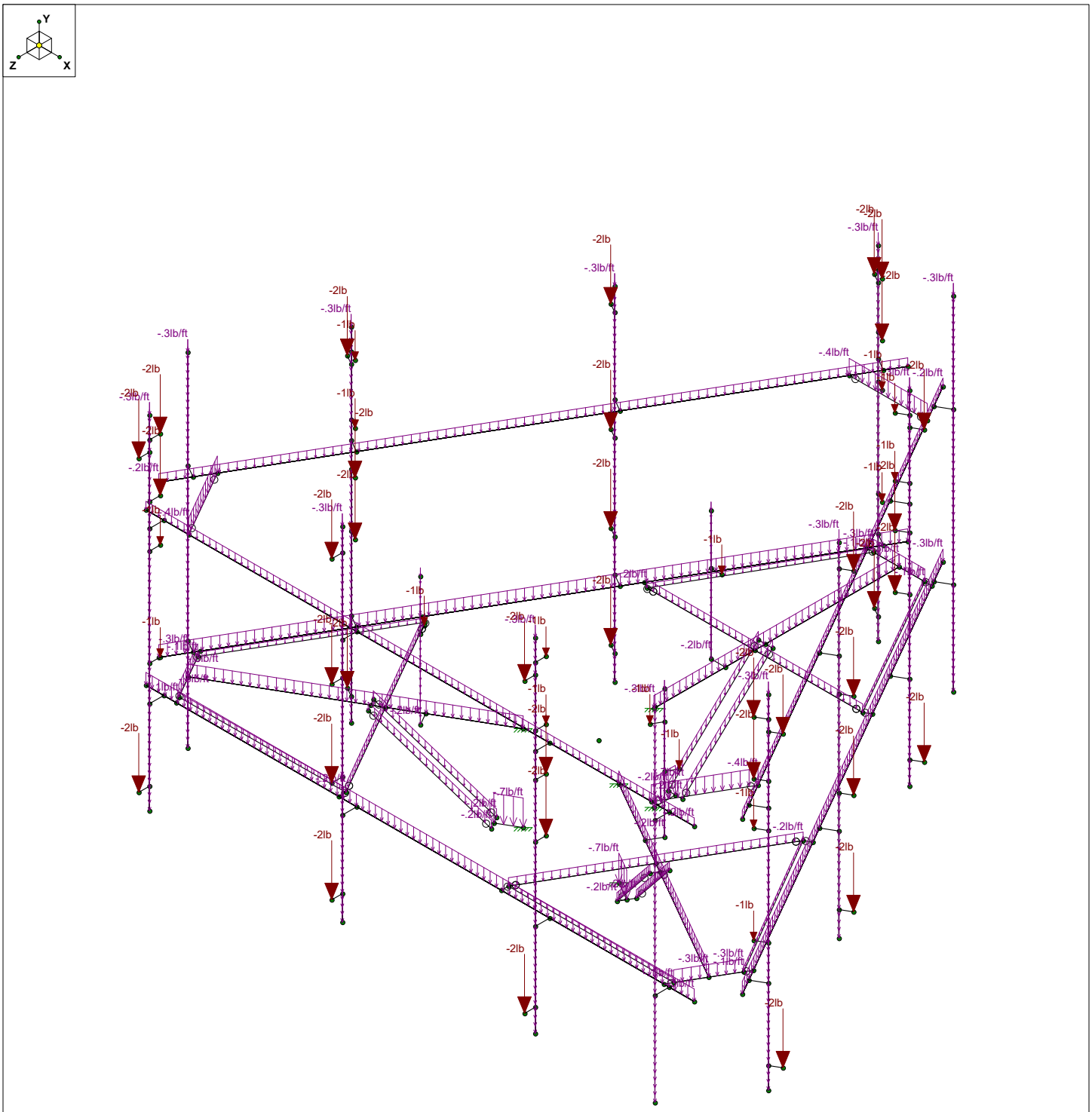
Loads: BLC 6, WL.i(90)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 11
GO	Mount Analysis	May 27, 2022 at 1:06 PM
CTL02638	Wind Load with Ice (X-Direction)	CTL02638-Mount Analysis - Rev H...



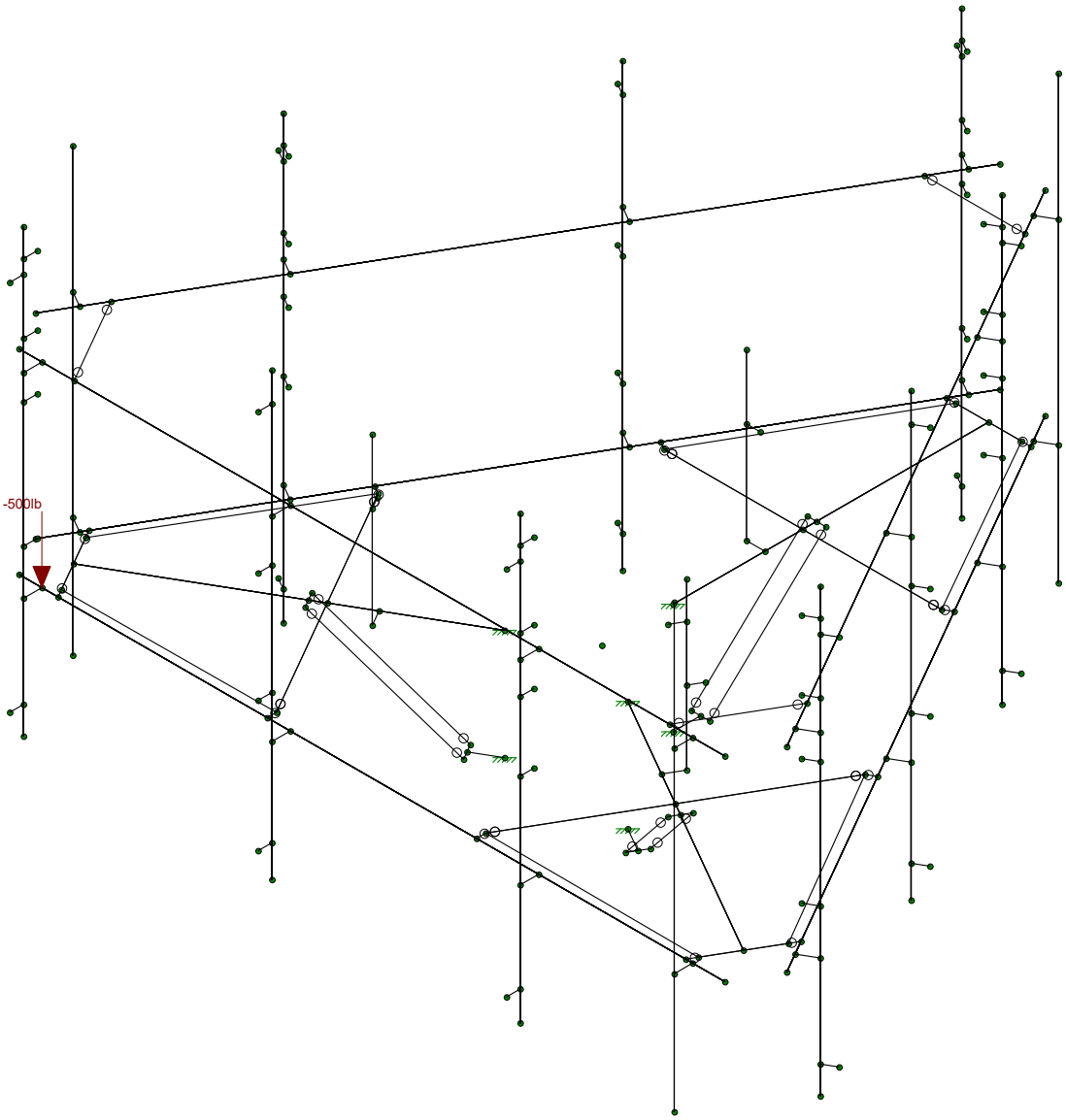
Loads: BLC 8, EH(0)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 12
GO	Mount Analysis	May 27, 2022 at 1:06 PM
CTL02638	Horizontal Seismic Load	CTL02638-Mount Analysis - Rev H...



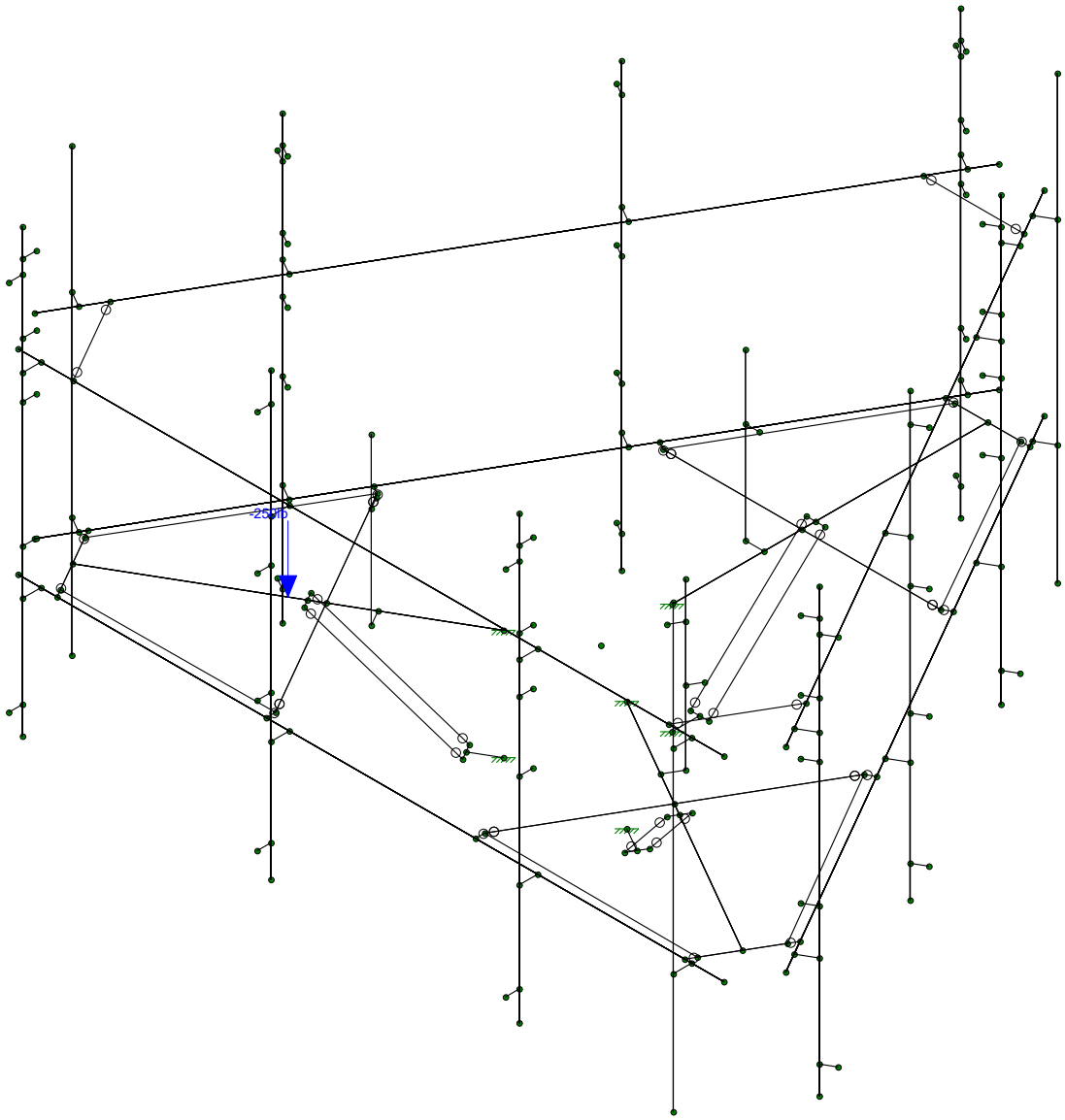
Loads: BLC 10, EV
Envelope Only Solution

Fullerton Engineering P.C.		SK - 13
GO	Mount Analysis	May 27, 2022 at 1:06 PM
CTL02638	Vertical Seismic Load	CTL02638-Mount Analysis - Rev H...



Loads: BLC 13, LM1
Envelope Only Solution

Fullerton Engineering P.C.		SK - 14
GO	Mount Analysis	May 27, 2022 at 1:07 PM
CTL02638	500lb Live Load	CTL02638-Mount Analysis - Rev H...



Loads: BLC 25, LV1
Envelope Only Solution

Fullerton Engineering P.C.		SK - 15
GO	Mount Analysis	May 27, 2022 at 1:07 PM
CTL02638	250lb Live Load	CTL02638-Mount Analysis - Rev H...

(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)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): LRFD
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?	No
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 7-16
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	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp to...	Lcomp b...	L-torque[i...	Kyy	Kzz	Cb	Func...
1	M5	Face Horizontal Bottom	153.5	45.5	45.5	45.5	45.5	45.5	2.1	2.1		Lateral
2	M10	Face Horizontal Top	153.5	54	54	54	54	54	2.1	2.1		Lateral
3	M11	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
4	M12	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
5	M13	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
6	M14	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
7	M19	Face Horizontal Bottom	153.5	45.5	45.5	45.5	45.5	45.5	2.1	2.1		Lateral
8	M24	Face Horizontal Top	153.5	54	54	54	54	54	2.1	2.1		Lateral
9	M25	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
10	M26	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
11	M27	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
12	M28	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
13	M33	Face Horizontal Bottom	153.5	45.5	45.5	45.5	45.5	45.5	2.1	2.1		Lateral
14	M38	Face Horizontal Top	153.5	54	54	54	54	54	2.1	2.1		Lateral
15	M39	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
16	M40	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
17	M41	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
18	M42	Mounting Pipe	96	42.5	42.5	42.5	42.5	42.5	2.1	2.1		Lateral
19	M43	Plate 1	2									Lateral
20	M44	Plate 1	2									Lateral
21	M45	Plate 1	2									Lateral
22	M46	Plate 1	2									Lateral
23	M47	Plate 1	2									Lateral
24	M48	Plate 1	2									Lateral
25	M49	Standoff Channel	60.388			Lbyy			1	1		Lateral
26	M50	Angel 1	21.853			Lbyy			1	1		Lateral
27	M51	Angel 1	21.853			Lbyy			1	1		Lateral
28	M52	Angel 1	21.853			Lbyy			1	1		Lateral
29	M53	Standoff Pipe	68.639			Lbyy			.65	.65		Lateral
30	M54	Angel 2	46.501			Lbyy			.65	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp to...	Lcomp b...	L-torque[i...	Kyy	Kzz	Cb	Func...
31	M55	Angel 2	46.501			Lbyy			.65	.65		Lateral
32	M56	Plate	14.353			Lbyy			.65	.65		Lateral
33	M57	Plate	2									Lateral
34	M58	Plate	2									Lateral
35	M59	Tube	6			Lbyy			.65	.65		Lateral
36	M60	Angel 3	34.825			Lbyy			1	1		Lateral
37	M61	Angel 3	34.825			Lbyy			1	1		Lateral
38	M66	Standoff Channel	60.388			Lbyy			1	1		Lateral
39	M67	Standoff Pipe	68.639			Lbyy			.65	.65		Lateral
40	M68	Angel 2	46.501			Lbyy			.65	.65		Lateral
41	M69	Angel 2	46.501			Lbyy			.65	.65		Lateral
42	M70	Plate	14.353			Lbyy			.65	.65		Lateral
43	M71	Plate	2									Lateral
44	M72	Plate	2									Lateral
45	M73	Tube	6			Lbyy			.65	.65		Lateral
46	M74	Angel 3	34.825			Lbyy			1	1		Lateral
47	M75	Angel 3	34.825			Lbyy			1	1		Lateral
48	M80	Standoff Channel	60.388			Lbyy			1	1		Lateral
49	M81	Standoff Pipe	68.639			Lbyy			.65	.65		Lateral
50	M82	Angel 2	46.501			Lbyy			.65	.65		Lateral
51	M83	Angel 2	46.501			Lbyy			.65	.65		Lateral
52	M84	Plate	14.353			Lbyy			.65	.65		Lateral
53	M85	Plate	2									Lateral
54	M86	Plate	2									Lateral
55	M87	Tube	6			Lbyy			.65	.65		Lateral
56	M88	Angel 3	34.825			Lbyy			1	1		Lateral
57	M89	Angel 3	34.825			Lbyy			1	1		Lateral
58	M111	Pipe	36	36	36	36	36	36	2.1	2.1		Lateral
59	M114	Pipe	36	36	36	36	36	36	2.1	2.1		Lateral
60	M117	Pipe	36	36	36	36	36	36	2.1	2.1		Lateral

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		91	288	0
3	Total General		91	288	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	C3X3.5	3	181.2	.056
7	A36 Gr.36	L2x2x3	6	279	.057
8	A36 Gr.36	L3X3X3	3	65.6	.02
9	A36 Gr.36	L3X3X4	6	209	.085
10	A36 Gr.36	PL3/8x6	6	12	.008
11	A36 Gr.36	PL1/2x6	9	55.1	.047
12	A500 Gr.46	HSS6X4X4	3	18	.022
13	A53 Gr. B	PIPE_2.0	6	568.5	.164
14	A53 Gr. B	PIPE_2.5	12	1152	.526
15	A53 Gr. B	PIPE_3.0	6	666.4	.391
16	Total HR Steel		60	3206.7	1.377

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	DL	None		-1		52			3	
2	DLi	None				52		48	3	
3	WL(0)	None				56		46		
4	WL(90)	None				52		41		
5	WL.i(0)	None				52		46		
6	WL.i(90)	None				50		41		
7	T	None								
8	EH(0)	None				52		48		
9	EH(90)	None				52		48		
10	EV	None				52		48		
11	WM(0)	None				52		46		
12	WM(90)	None				52		41		
13	LM1	None				1				
14	LM2	None				1				
15	LM3	None				1				
16	LM4	None				1				
17	LM5	None				1				
18	LM6	None				1				
19	LM7	None				1				
20	LM8	None				1				
21	LM9	None				1				
22	LM10	None				1				
23	LM11	None				1				
24	LM12	None				1				
25	LV1	None					1			
26	LV2	None					1			
27	LV3	None					1			
28	BLC 1 Transient Area Loads	None						69		
29	BLC 2 Transient Area Loads	None						69		

Load Combinations

	Description	S...	PD...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	BLC	Fa...	BLC	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										
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												

Load Combinations (Continued)

	Description	S...	PD...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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*LM4+1.0*WM(0)	Y...	Y		1	1.2	16	1.5	11	1														
79	1.2*DL+1.5*LM4+1.0*WM(30)	Y...	Y		1	1.2	16	1.5	11	.866	12	.5												
80	1.2*DL+1.5*LM4+1.0*WM(60)	Y...	Y		1	1.2	16	1.5	11	.5	12	.866												

Load Combinations (Continued)

	Description	S...	PD...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
81	1.2*DL+1.5*LM4+1.0*WM(90)	Y...	Y		1	1.2	16	1.5	12	1														
82	1.2*DL+1.5*LM4+1.0*WM(120)	Y...	Y		1	1.2	16	1.5	11	-.5	12	.866												
83	1.2*DL+1.5*LM4+1.0*WM(150)	Y...	Y		1	1.2	16	1.5	11	-.8...	12	.5												
84	1.2*DL+1.5*LM4+1.0*WM(180)	Y...	Y		1	1.2	16	1.5	11	-1														
85	1.2*DL+1.5*LM4+1.0*WM(210)	Y...	Y		1	1.2	16	1.5	11	-.8...	12	-.5												
86	1.2*DL+1.5*LM4+1.0*WM(240)	Y...	Y		1	1.2	16	1.5	11	-.5	12	-.8...												
87	1.2*DL+1.5*LM4+1.0*WM(270)	Y...	Y		1	1.2	16	1.5	12	-1														
88	1.2*DL+1.5*LM4+1.0*WM(300)	Y...	Y		1	1.2	16	1.5	11	.5	12	-.8...												
89	1.2*DL+1.5*LM4+1.0*WM(330)	Y...	Y		1	1.2	16	1.5	11	.866	12	-.5												
90	1.2*DL+1.5*LM5+1.0*WM(0)	Y...	Y		1	1.2	17	1.5	11	1														
91	1.2*DL+1.5*LM5+1.0*WM(30)	Y...	Y		1	1.2	17	1.5	11	.866	12	.5												
92	1.2*DL+1.5*LM5+1.0*WM(60)	Y...	Y		1	1.2	17	1.5	11	.5	12	.866												
93	1.2*DL+1.5*LM5+1.0*WM(90)	Y...	Y		1	1.2	17	1.5	12	1														
94	1.2*DL+1.5*LM5+1.0*WM(120)	Y...	Y		1	1.2	17	1.5	11	-.5	12	.866												
95	1.2*DL+1.5*LM5+1.0*WM(150)	Y...	Y		1	1.2	17	1.5	11	-.8...	12	.5												
96	1.2*DL+1.5*LM5+1.0*WM(180)	Y...	Y		1	1.2	17	1.5	11	-1														
97	1.2*DL+1.5*LM5+1.0*WM(210)	Y...	Y		1	1.2	17	1.5	11	-.8...	12	-.5												
98	1.2*DL+1.5*LM5+1.0*WM(240)	Y...	Y		1	1.2	17	1.5	11	-.5	12	-.8...												
99	1.2*DL+1.5*LM5+1.0*WM(270)	Y...	Y		1	1.2	17	1.5	12	-1														
100	1.2*DL+1.5*LM5+1.0*WM(300)	Y...	Y		1	1.2	17	1.5	11	.5	12	-.8...												
101	1.2*DL+1.5*LM5+1.0*WM(330)	Y...	Y		1	1.2	17	1.5	11	.866	12	-.5												
102	1.2*DL+1.5*LM6+1.0*WM(0)	Y...	Y		1	1.2	18	1.5	11	1														
103	1.2*DL+1.5*LM6+1.0*WM(30)	Y...	Y		1	1.2	18	1.5	11	.866	12	.5												
104	1.2*DL+1.5*LM6+1.0*WM(60)	Y...	Y		1	1.2	18	1.5	11	.5	12	.866												
105	1.2*DL+1.5*LM6+1.0*WM(90)	Y...	Y		1	1.2	18	1.5	12	1														
106	1.2*DL+1.5*LM6+1.0*WM(120)	Y...	Y		1	1.2	18	1.5	11	-.5	12	.866												
107	1.2*DL+1.5*LM6+1.0*WM(150)	Y...	Y		1	1.2	18	1.5	11	-.8...	12	.5												
108	1.2*DL+1.5*LM6+1.0*WM(180)	Y...	Y		1	1.2	18	1.5	11	-1														
109	1.2*DL+1.5*LM6+1.0*WM(210)	Y...	Y		1	1.2	18	1.5	11	-.8...	12	-.5												
110	1.2*DL+1.5*LM6+1.0*WM(240)	Y...	Y		1	1.2	18	1.5	11	-.5	12	-.8...												
111	1.2*DL+1.5*LM6+1.0*WM(270)	Y...	Y		1	1.2	18	1.5	12	-1														
112	1.2*DL+1.5*LM6+1.0*WM(300)	Y...	Y		1	1.2	18	1.5	11	.5	12	-.8...												
113	1.2*DL+1.5*LM6+1.0*WM(330)	Y...	Y		1	1.2	18	1.5	11	.866	12	-.5												
114	1.2*DL+1.5*LM7+1.0*WM(0)	Y...	Y		1	1.2	19	1.5	11	1														
115	1.2*DL+1.5*LM7+1.0*WM(30)	Y...	Y		1	1.2	19	1.5	11	.866	12	.5												
116	1.2*DL+1.5*LM7+1.0*WM(60)	Y...	Y		1	1.2	19	1.5	11	.5	12	.866												
117	1.2*DL+1.5*LM7+1.0*WM(90)	Y...	Y		1	1.2	19	1.5	12	1														
118	1.2*DL+1.5*LM7+1.0*WM(120)	Y...	Y		1	1.2	19	1.5	11	-.5	12	.866												
119	1.2*DL+1.5*LM7+1.0*WM(150)	Y...	Y		1	1.2	19	1.5	11	-.8...	12	.5												
120	1.2*DL+1.5*LM7+1.0*WM(180)	Y...	Y		1	1.2	19	1.5	11	-1														
121	1.2*DL+1.5*LM7+1.0*WM(210)	Y...	Y		1	1.2	19	1.5	11	-.8...	12	-.5												
122	1.2*DL+1.5*LM7+1.0*WM(240)	Y...	Y		1	1.2	19	1.5	11	-.5	12	-.8...												
123	1.2*DL+1.5*LM7+1.0*WM(270)	Y...	Y		1	1.2	19	1.5	12	-1														
124	1.2*DL+1.5*LM7+1.0*WM(300)	Y...	Y		1	1.2	19	1.5	11	.5	12	-.8...												
125	1.2*DL+1.5*LM7+1.0*WM(330)	Y...	Y		1	1.2	19	1.5	11	.866	12	-.5												
126	1.2*DL+1.5*LM8+1.0*WM(0)	Y...	Y		1	1.2	20	1.5	11	1														
127	1.2*DL+1.5*LM8+1.0*WM(30)	Y...	Y		1	1.2	20	1.5	11	.866	12	.5												
128	1.2*DL+1.5*LM8+1.0*WM(60)	Y...	Y		1	1.2	20	1.5	11	.5	12	.866												
129	1.2*DL+1.5*LM8+1.0*WM(90)	Y...	Y		1	1.2	20	1.5	12	1														
130	1.2*DL+1.5*LM8+1.0*WM(120)	Y...	Y		1	1.2	20	1.5	11	-.5	12	.866												
131	1.2*DL+1.5*LM8+1.0*WM(150)	Y...	Y		1	1.2	20	1.5	11	-.8...	12	.5												
132	1.2*DL+1.5*LM8+1.0*WM(180)	Y...	Y		1	1.2	20	1.5	11	-1														
133	1.2*DL+1.5*LM8+1.0*WM(210)	Y...	Y		1	1.2	20	1.5	11	-.8...	12	-.5												
134	1.2*DL+1.5*LM8+1.0*WM(240)	Y...	Y		1	1.2	20	1.5	11	-.5	12	-.8...												
135	1.2*DL+1.5*LM8+1.0*WM(270)	Y...	Y		1	1.2	20	1.5	12	-1														
136	1.2*DL+1.5*LM8+1.0*WM(300)	Y...	Y		1	1.2	20	1.5	11	.5	12	-.8...												
137	1.2*DL+1.5*LM8+1.0*WM(330)	Y...	Y		1	1.2	20	1.5	11	.866	12	-.5												

Load Combinations (Continued)

	Description	S...	PD...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
138	1.2*DL+1.5*LM9+1.0*WM(0)	Y...	Y		1	1.2	21	1.5	11	1														
139	1.2*DL+1.5*LM9+1.0*WM(30)	Y...	Y		1	1.2	21	1.5	11	.866	12	.5												
140	1.2*DL+1.5*LM9+1.0*WM(60)	Y...	Y		1	1.2	21	1.5	11	.5	12	.866												
141	1.2*DL+1.5*LM9+1.0*WM(90)	Y...	Y		1	1.2	21	1.5	12	1														
142	1.2*DL+1.5*LM9+1.0*WM(120)	Y...	Y		1	1.2	21	1.5	11	-.5	12	.866												
143	1.2*DL+1.5*LM9+1.0*WM(150)	Y...	Y		1	1.2	21	1.5	11	-.8...	12	.5												
144	1.2*DL+1.5*LM9+1.0*WM(180)	Y...	Y		1	1.2	21	1.5	11	-1														
145	1.2*DL+1.5*LM9+1.0*WM(210)	Y...	Y		1	1.2	21	1.5	11	-.8...	12	-.5												
146	1.2*DL+1.5*LM9+1.0*WM(240)	Y...	Y		1	1.2	21	1.5	11	-.5	12	-.8...												
147	1.2*DL+1.5*LM9+1.0*WM(270)	Y...	Y		1	1.2	21	1.5	12	-1														
148	1.2*DL+1.5*LM9+1.0*WM(300)	Y...	Y		1	1.2	21	1.5	11	.5	12	-.8...												
149	1.2*DL+1.5*LM9+1.0*WM(330)	Y...	Y		1	1.2	21	1.5	11	.866	12	-.5												
150	1.2*DL+1.5*LM10+1.0*WM(0)	Y...	Y		1	1.2	22	1.5	11	1														
151	1.2*DL+1.5*LM10+1.0*WM(30)	Y...	Y		1	1.2	22	1.5	11	.866	12	.5												
152	1.2*DL+1.5*LM10+1.0*WM(60)	Y...	Y		1	1.2	22	1.5	11	.5	12	.866												
153	1.2*DL+1.5*LM10+1.0*WM(90)	Y...	Y		1	1.2	22	1.5	12	1														
154	1.2*DL+1.5*LM10+1.0*WM(120)	Y...	Y		1	1.2	22	1.5	11	-.5	12	.866												
155	1.2*DL+1.5*LM10+1.0*WM(150)	Y...	Y		1	1.2	22	1.5	11	-.8...	12	.5												
156	1.2*DL+1.5*LM10+1.0*WM(180)	Y...	Y		1	1.2	22	1.5	11	-1														
157	1.2*DL+1.5*LM10+1.0*WM(210)	Y...	Y		1	1.2	22	1.5	11	-.8...	12	-.5												
158	1.2*DL+1.5*LM10+1.0*WM(240)	Y...	Y		1	1.2	22	1.5	11	-.5	12	-.8...												
159	1.2*DL+1.5*LM10+1.0*WM(270)	Y...	Y		1	1.2	22	1.5	12	-1														
160	1.2*DL+1.5*LM10+1.0*WM(300)	Y...	Y		1	1.2	22	1.5	11	.5	12	-.8...												
161	1.2*DL+1.5*LM10+1.0*WM(330)	Y...	Y		1	1.2	22	1.5	11	.866	12	-.5												
162	1.2*DL+1.5*LM11+1.0*WM(0)	Y...	Y		1	1.2	23	1.5	11	1														
163	1.2*DL+1.5*LM11+1.0*WM(30)	Y...	Y		1	1.2	23	1.5	11	.866	12	.5												
164	1.2*DL+1.5*LM11+1.0*WM(60)	Y...	Y		1	1.2	23	1.5	11	.5	12	.866												
165	1.2*DL+1.5*LM11+1.0*WM(90)	Y...	Y		1	1.2	23	1.5	12	1														
166	1.2*DL+1.5*LM11+1.0*WM(120)	Y...	Y		1	1.2	23	1.5	11	-.5	12	.866												
167	1.2*DL+1.5*LM11+1.0*WM(150)	Y...	Y		1	1.2	23	1.5	11	-.8...	12	.5												
168	1.2*DL+1.5*LM11+1.0*WM(180)	Y...	Y		1	1.2	23	1.5	11	-1														
169	1.2*DL+1.5*LM11+1.0*WM(210)	Y...	Y		1	1.2	23	1.5	11	-.8...	12	-.5												
170	1.2*DL+1.5*LM11+1.0*WM(240)	Y...	Y		1	1.2	23	1.5	11	-.5	12	-.8...												
171	1.2*DL+1.5*LM11+1.0*WM(270)	Y...	Y		1	1.2	23	1.5	12	-1														
172	1.2*DL+1.5*LM11+1.0*WM(300)	Y...	Y		1	1.2	23	1.5	11	.5	12	-.8...												
173	1.2*DL+1.5*LM11+1.0*WM(330)	Y...	Y		1	1.2	23	1.5	11	.866	12	-.5												
174	1.2*DL+1.5*LM12+1.0*WM(0)	Y...	Y		1	1.2	24	1.5	11	1														
175	1.2*DL+1.5*LM12+1.0*WM(30)	Y...	Y		1	1.2	24	1.5	11	.866	12	.5												
176	1.2*DL+1.5*LM12+1.0*WM(60)	Y...	Y		1	1.2	24	1.5	11	.5	12	.866												
177	1.2*DL+1.5*LM12+1.0*WM(90)	Y...	Y		1	1.2	24	1.5	12	1														
178	1.2*DL+1.5*LM12+1.0*WM(120)	Y...	Y		1	1.2	24	1.5	11	-.5	12	.866												
179	1.2*DL+1.5*LM12+1.0*WM(150)	Y...	Y		1	1.2	24	1.5	11	-.8...	12	.5												
180	1.2*DL+1.5*LM12+1.0*WM(180)	Y...	Y		1	1.2	24	1.5	11	-1														
181	1.2*DL+1.5*LM12+1.0*WM(210)	Y...	Y		1	1.2	24	1.5	11	-.8...	12	-.5												
182	1.2*DL+1.5*LM12+1.0*WM(240)	Y...	Y		1	1.2	24	1.5	11	-.5	12	-.8...												
183	1.2*DL+1.5*LM12+1.0*WM(270)	Y...	Y		1	1.2	24	1.5	12	-1														
184	1.2*DL+1.5*LM12+1.0*WM(300)	Y...	Y		1	1.2	24	1.5	11	.5	12	-.8...												
185	1.2*DL+1.5*LM12+1.0*WM(330)	Y...	Y		1	1.2	24	1.5	11	.866	12	-.5												
186	1.2*DL+1.5*LV1	Y...	Y		1	1.2	25	1.5																
187	1.2*DL+1.5*LV2	Y...	Y		1	1.2	26	1.5																
188	1.2*DL+1.5*LV3	Y...	Y		1	1.2	27	1.5																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N107	max	1733.386	5	368.923	8	6876.739	2	.275	8	2.919	11	.313	5
2		min	-1746.909	11	-2178.418	2	-2654.216	8	-1.685	2	-2.865	5	-.403	11
3	N112	max	30.511	6	4587.22	14	-14.895	8	2.291	14	.449	11	.404	11
4		min	-31.256	10	6.89	8	-4757.859	14	.001	8	-.544	5	-.495	5
5	N121	max	6244.03	6	531.618	12	1889.093	12	.914	6	1.828	2	1.533	6
6		min	-2609.592	12	-2307.558	6	-3985.327	6	-.359	12	-1.713	8	-.257	12
7	N126	max	244.697	12	4790.144	6	2490.333	6	.196	12	.265	2	.05	12
8		min	-4304.476	6	-278.812	12	-138.269	12	-1.45	6	-.392	7	-1.93	18
9	N135	max	2608.962	4	561.087	4	1909.562	4	1.032	98	1.437	8	.353	4
10		min	-6261.919	10	-2307.211	10	-4052.121	10	-.228	4	-1.41	2	-1.465	10
11	N140	max	4333.711	10	4821.729	10	2506.605	10	.187	4	.219	84	2.073	10
12		min	-238.116	4	-271.815	4	-134.671	4	-1.228	10	-.355	90	-.052	4
13	Totals:	max	6080.71	5	7317.526	18	5456.653	2						
14		min	-6080.675	11	2931.203	40	-5456.624	8						

Stress ratio <1.0, members are adquate

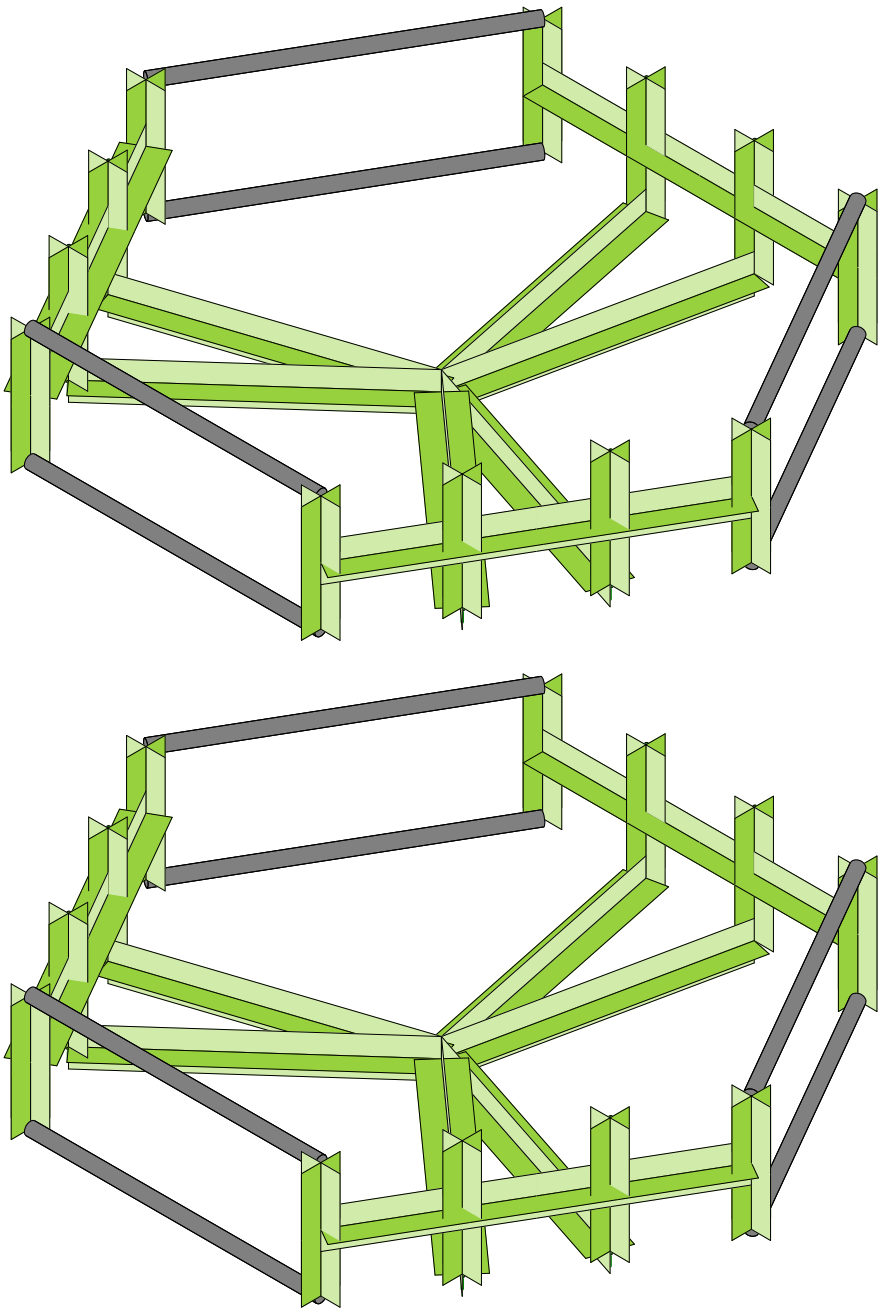
Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M54	L2x2x3	.858	0	5	.364	46.501	y	24	17023...	23392.8	.558	1.212	...	H2-1
2	M55	L2x2x3	.852	0	11	.345	46.501	z	15	17023...	23392.8	.558	1.21	...	H2-1
3	M83	L2x2x3	.795	0	6	.356	46.501	y	11	17023...	23392.8	.558	1.224	...	H2-1
4	M67	PIPE_3.0	.784	37.894	6	.211	37.894		44	60554...	65205	5.749	5.749	...	H1-1b
5	M81	PIPE_3.0	.784	37.894	10	.221	37.894		10	60554...	65205	5.749	5.749	...	H1-1b
6	M68	L2x2x3	.773	0	9	.364	46.501	y	16	17023...	23392.8	.558	1.221	...	H2-1
7	M82	L2x2x3	.771	0	13	.362	46.501	y	21	17023...	23392.8	.558	1.22	...	H2-1
8	M69	L2x2x3	.767	0	2	.344	46.501	z	19	17023...	23392.8	.558	1.22	...	H2-1
9	M53	PIPE_3.0	.739	37.894	2	.251	37.894		12	60554...	65205	5.749	5.749	...	H1-1b
10	M84	PL1/2x6	.681	7.176	5	.757	7.326	y	12	78010...	97200	1.012	12.15	...	H1-1b
11	M70	PL1/2x6	.605	7.176	11	.720	7.176	y	9	78010...	97200	1.012	12.15	...	H1-1b
12	M56	PL1/2x6	.563	7.176	9	.772	7.176	y	5	78010...	97200	1.012	12.15	...	H1-1b
13	M38	PIPE_2.0	.541	11.193	6	.348	12.792		6	11014...	32130	1.872	1.872	1	H3-6
14	M10	PIPE_2.0	.529	11.193	10	.339	147....		5	11014...	32130	1.872	1.872	1	H3-6
15	M39	PIPE_2.5	.526	70	12	.151	33		13	32250...	50715	3.596	3.596	1	H1-1b
16	M11	PIPE_2.5	.523	70	5	.165	33		5	32250...	50715	3.596	3.596	1	H1-1b
17	M40	PIPE_2.5	.516	70	13	.282	70		13	32250...	50715	3.596	3.596	1	H3-6
18	M24	PIPE_2.0	.508	140.7...	10	.310	147....		9	11014...	32130	1.872	1.872	1	H3-6
19	M12	PIPE_2.5	.503	70	5	.297	70		5	32250...	50715	3.596	3.596	1	H3-6
20	M26	PIPE_2.5	.496	70	9	.280	70		9	32250...	50715	3.596	3.596	1	H3-6
21	M25	PIPE_2.5	.466	70	9	.145	33		9	32250...	50715	3.596	3.596	1	H1-1b
22	M49	C3X3.5	.462	30.194	12	.539	30.194	y	25	10469...	35316	.788	3.348	...	H1-1b
23	M45	PL3/8x6	.450	0	5	.427	0	y	6	71583...	72900	.57	9.113	...	H1-1b
24	M13	PIPE_2.5	.448	70	11	.300	34		10	32250...	50715	3.596	3.596	1	H3-6
25	M41	PIPE_2.5	.444	70	7	.300	34		6	32250...	50715	3.596	3.596	1	H3-6
26	M66	C3X3.5	.437	30.194	5	.538	30.194	y	16	10469...	35316	.788	3.348	...	H1-1b
27	M80	C3X3.5	.429	30.194	9	.535	30.194	y	21	10469...	35316	.788	3.348	...	H1-1b
28	M14	PIPE_2.5	.425	70	11	.195	28		10	32250...	50715	3.596	3.596	1	H1-1b
29	M27	PIPE_2.5	.420	70	4	.251	34		2	32250...	50715	3.596	3.596	1	H1-1b
30	M42	PIPE_2.5	.404	70	7	.191	28		6	32250...	50715	3.596	3.596	1	H1-1b
31	M28	PIPE_2.5	.387	70	3	.155	28		2	32250...	50715	3.596	3.596	1	H1-1b
32	M48	PL3/8x6	.377	0	11	.396	0	y	9	71583...	72900	.57	9.113	...	H1-1b
33	M43	PL3/8x6	.364	0	13	.384	0	y	2	71583...	72900	.57	9.113	...	H1-1b
34	M47	PL3/8x6	.347	0	9	.385	2	y	10	71583...	72900	.57	9.113	...	H1-1b
35	M33	PIPE_3.0	.303	41.573	13	.328	54.365		6	46439...	65205	5.749	5.749	1	H3-6
36	M46	PL3/8x6	.298	0	7	.395	0	y	5	71583...	72900	.57	9.113	...	H1-1b
37	M44	PL3/8x6	.293	0	3	.401	0	y	13	71583...	72900	.57	9.113	...	H1-1b
38	M5	PIPE_3.0	.284	41.573	5	.344	145....		5	46439...	65205	5.749	5.749	1	H3-6

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

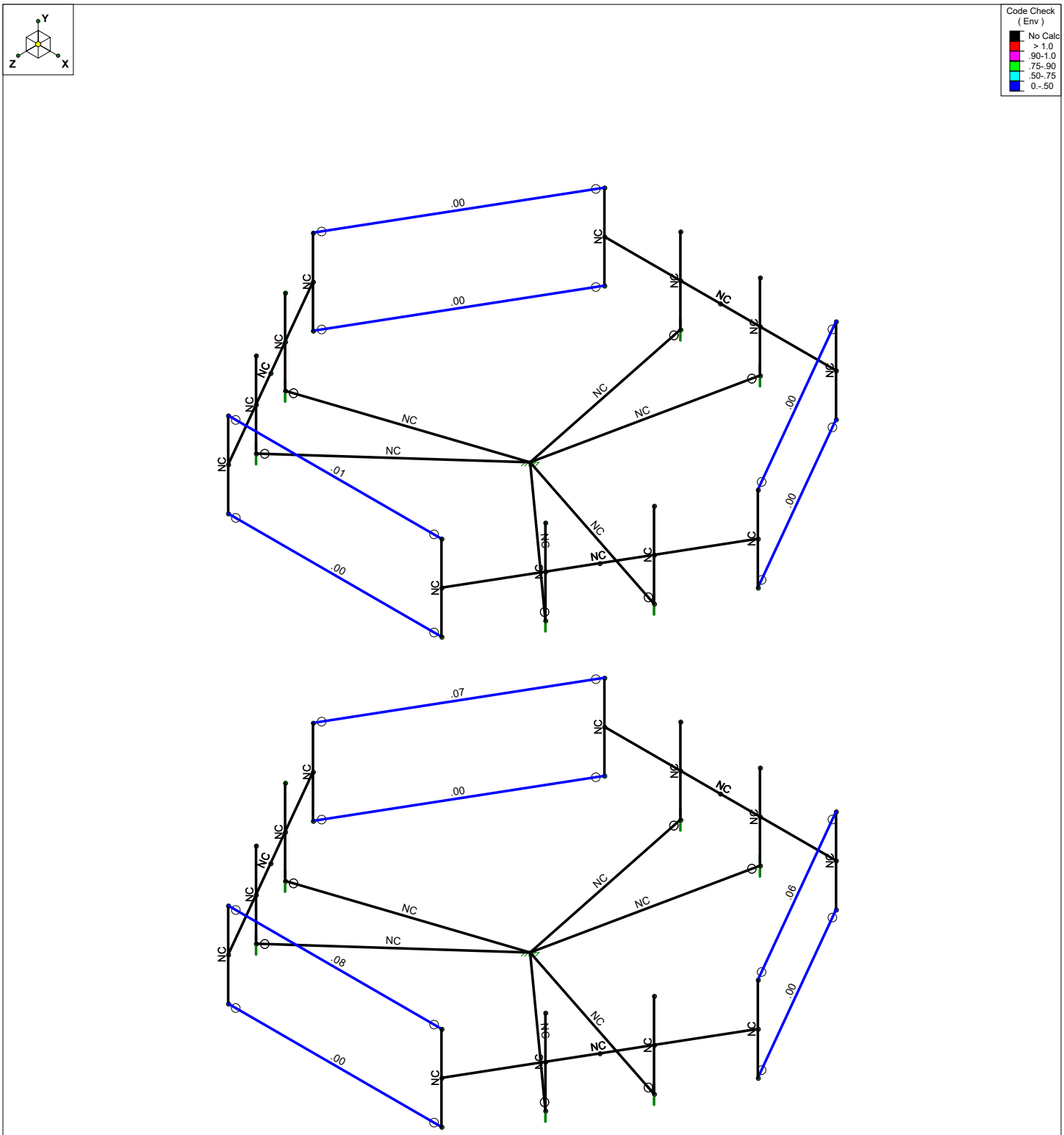
	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
39	M19	PIPE_3.0	.269	41.573	9	.312	145....		9	46439...	65205	5.749	5.749	1	H3-6
40	M75	L3X3X4	.130	17.775	6	.011	34.825	y	2	38715...	46656	1.688	3.677	...	H2-1
41	M61	L3X3X4	.118	17.05	140	.017	0	y	11	38715...	46656	1.688	3.677	...	H2-1
42	M89	L3X3X4	.118	17.05	99	.008	0	y	8	38715...	46656	1.688	3.677	...	H2-1
43	M60	L3X3X4	.113	17.413	12	.017	0	y	11	38715...	46656	1.688	3.677	...	H2-1
44	M73	HSS6X4X4	.109	0	6	.092	0	y	6	17794...	178020	22.252	29.428	...	H1-1b
45	M88	L3X3X4	.104	17.05	86	.008	34.825	y	8	38715...	46656	1.688	3.677	...	H2-1
46	M74	L3X3X4	.103	17.05	176	.011	34.825	y	2	38715...	46656	1.688	3.677	...	H2-1
47	M87	HSS6X4X4	.099	0	98	.084	0	y	99	17794...	178020	22.252	29.428	...	H1-1b
48	M59	HSS6X4X4	.099	0	139	.084	0	y	139	17794...	178020	22.252	29.428	...	H1-1b
49	M86	PL1/2x6	.098	0	11	1.271	0	y	7	96222...	97200	1.012	12.15	...	H1-1b
50	M58	PL1/2x6	.079	0	10	1.365	0	y	11	96222...	97200	1.012	12.15	...	H1-1b
51	M71	PL1/2x6	.075	0	5	1.329	0	y	9	96222...	97200	1.012	12.15	...	H1-1b
52	M72	PL1/2x6	.073	0	2	1.279	0	y	3	96222...	97200	1.012	12.15	...	H1-1b
53	M117	PIPE_2.0	.068	0	10	.008	16.125		10	19963...	32130	1.872	1.872	1	H1-1b
54	M57	PL1/2x6	.056	0	13	1.418	0	y	5	96222...	97200	1.012	12.15	...	H1-1b
55	M85	PL1/2x6	.049	0	2	1.337	0	y	13	96222...	97200	1.012	12.15	...	H1-1b
56	M114	PIPE_2.0	.047	0	3	.008	0		6	19963...	32130	1.872	1.872	1	H1-1b
57	M111	PIPE_2.0	.046	0	11	.008	0		2	19963...	32130	1.872	1.872	1	H1-1b
58	M51	L3X3X3	.040	10.926	4	.197	0	z	13	27658...	35316	1.32	2.905	...	H2-1
59	M50	L3X3X3	.040	10.926	12	.195	0	z	9	27658...	35316	1.32	2.905	...	H2-1
60	M52	L3X3X3	.032	10.926	2	.213	21.853	z	5	27658...	35316	1.32	2.833	...	H2-1

Stress ratio <1.0, members are adquate



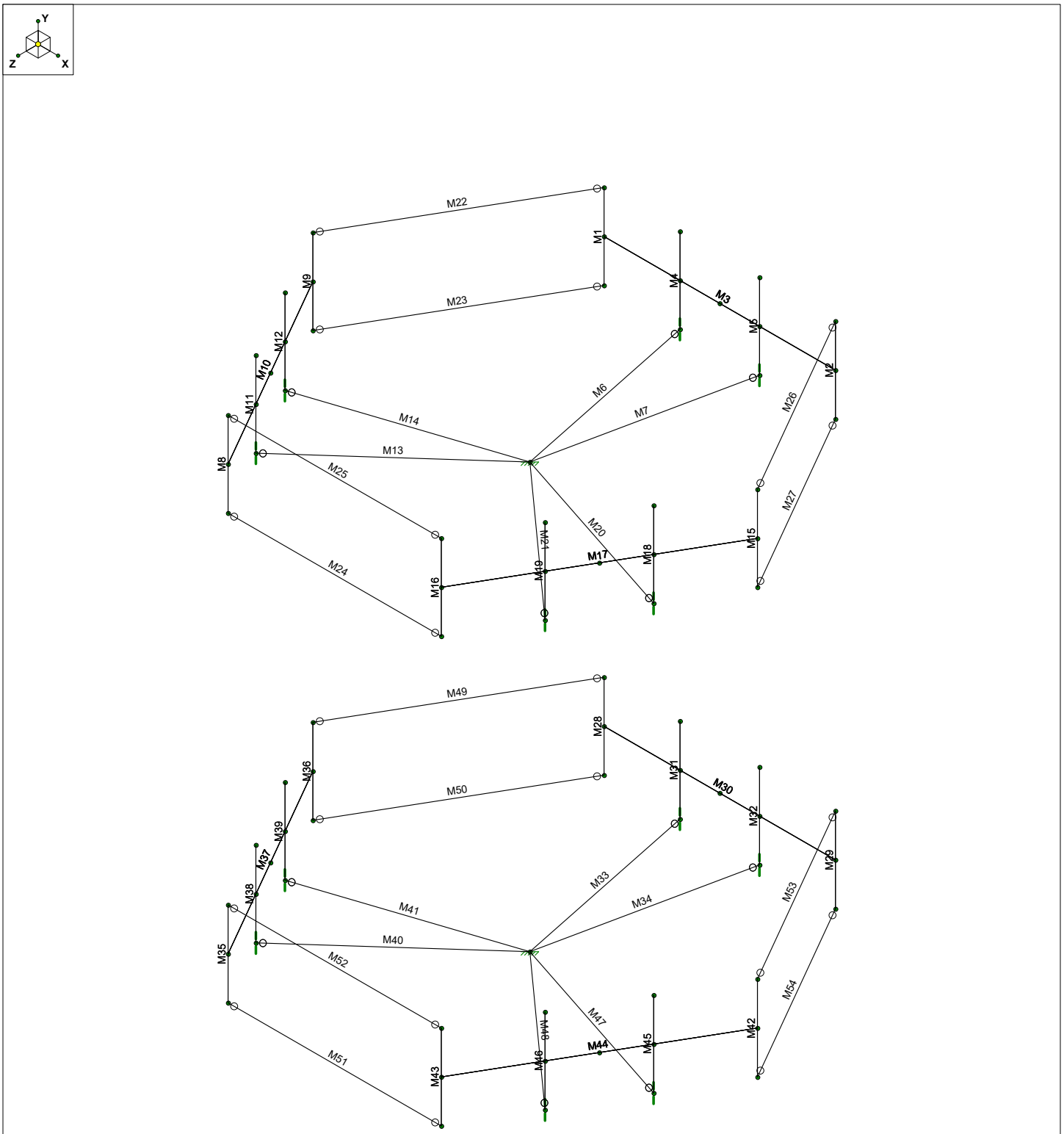
Envelope Only Solution

Fullerton Engineering P.C.		SK - 1
GO	Collar Mount Analysis	May 31, 2022 at 9:30 AM
CTL02638	3D Render	CTL02638-Collar Mount Analysis.r3d



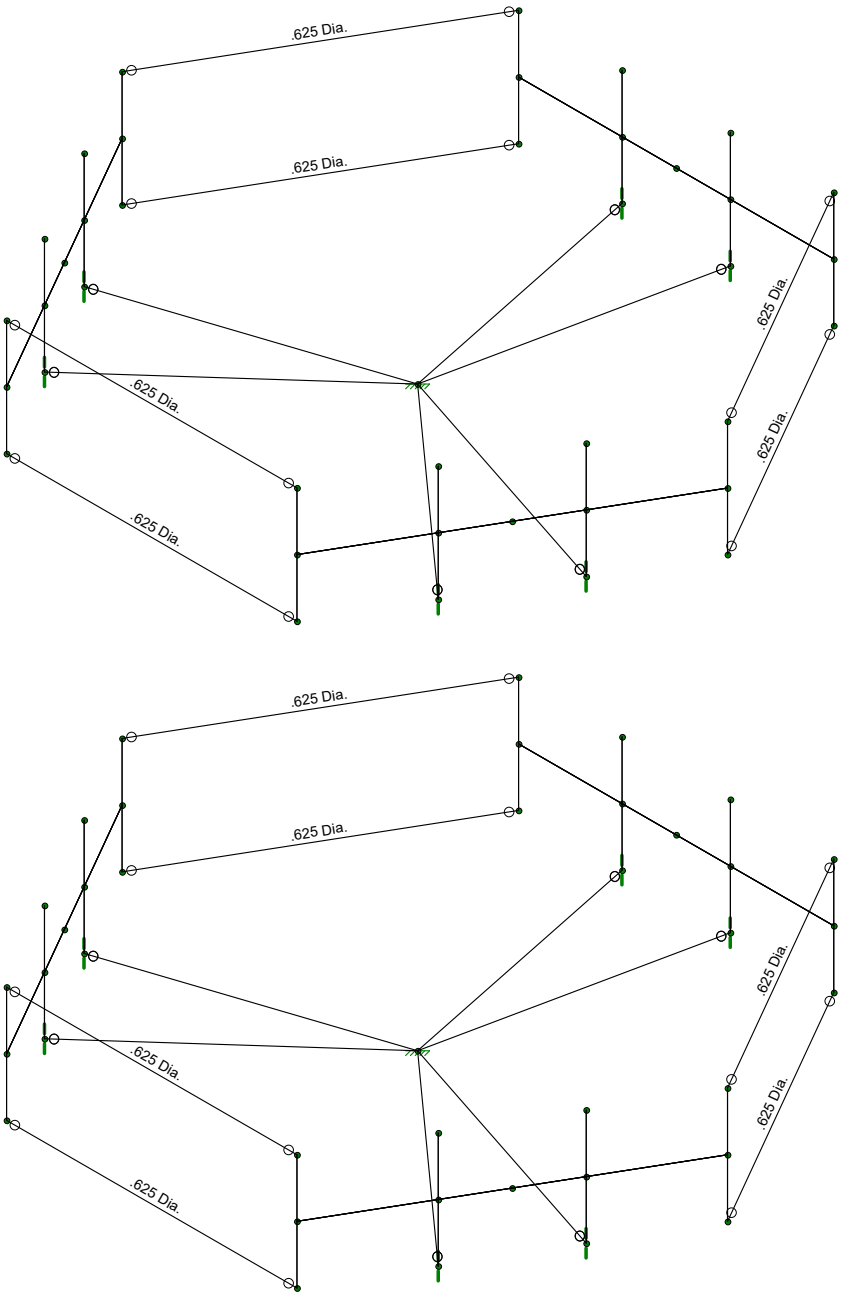
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Fullerton Engineering P.C.		SK - 2
GO	Collar Mount Analysis	May 31, 2022 at 9:30 AM
CTL02638	Unity Graphic	CTL02638-Collar Mount Analysis.r3d



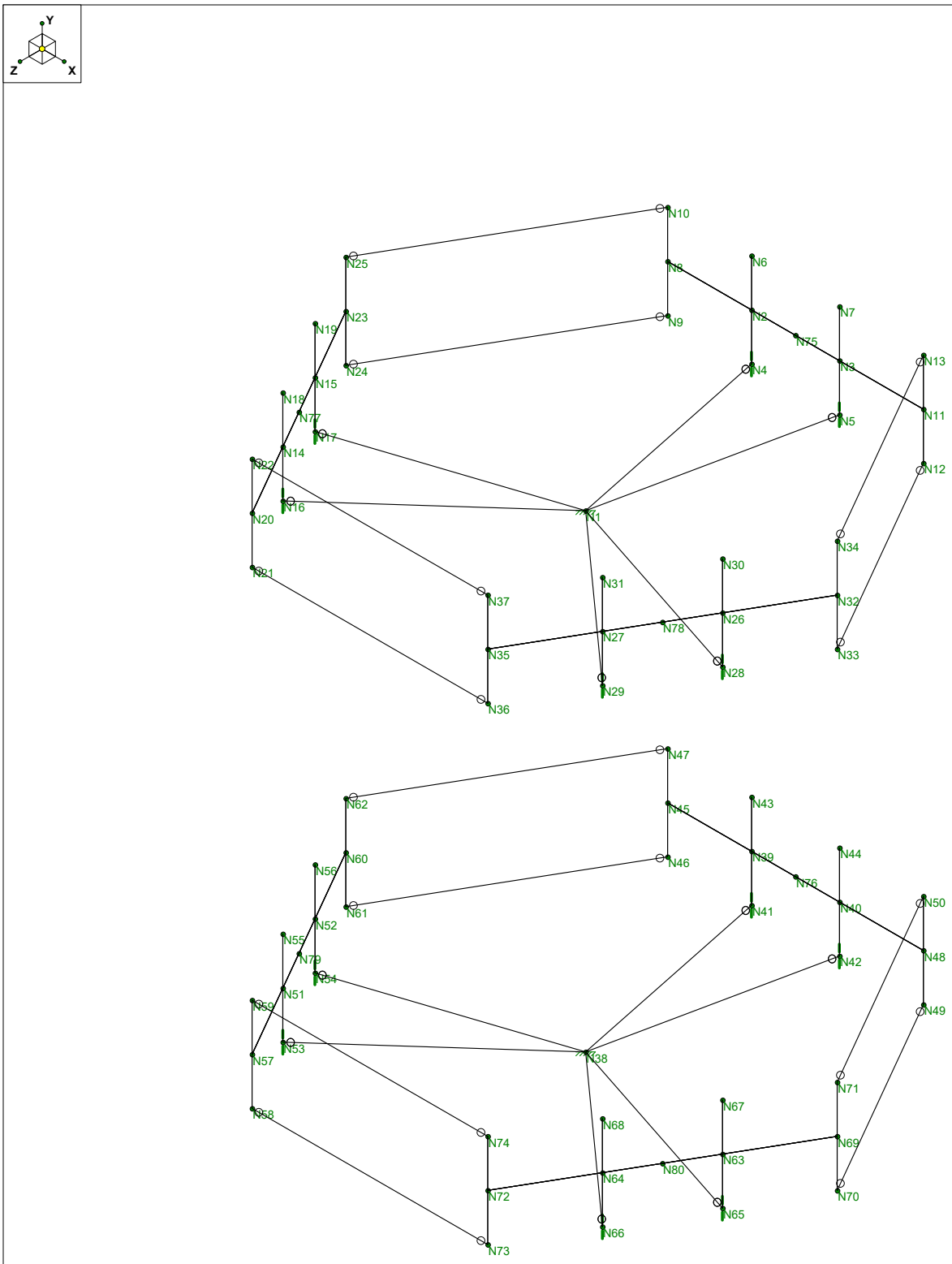
Envelope Only Solution

Fullerton Engineering P.C.		SK - 3
GO	Collar Mount Analysis	May 31, 2022 at 9:31 AM
CTL02638	Member Label	CTL02638-Collar Mount Analysis.r3d



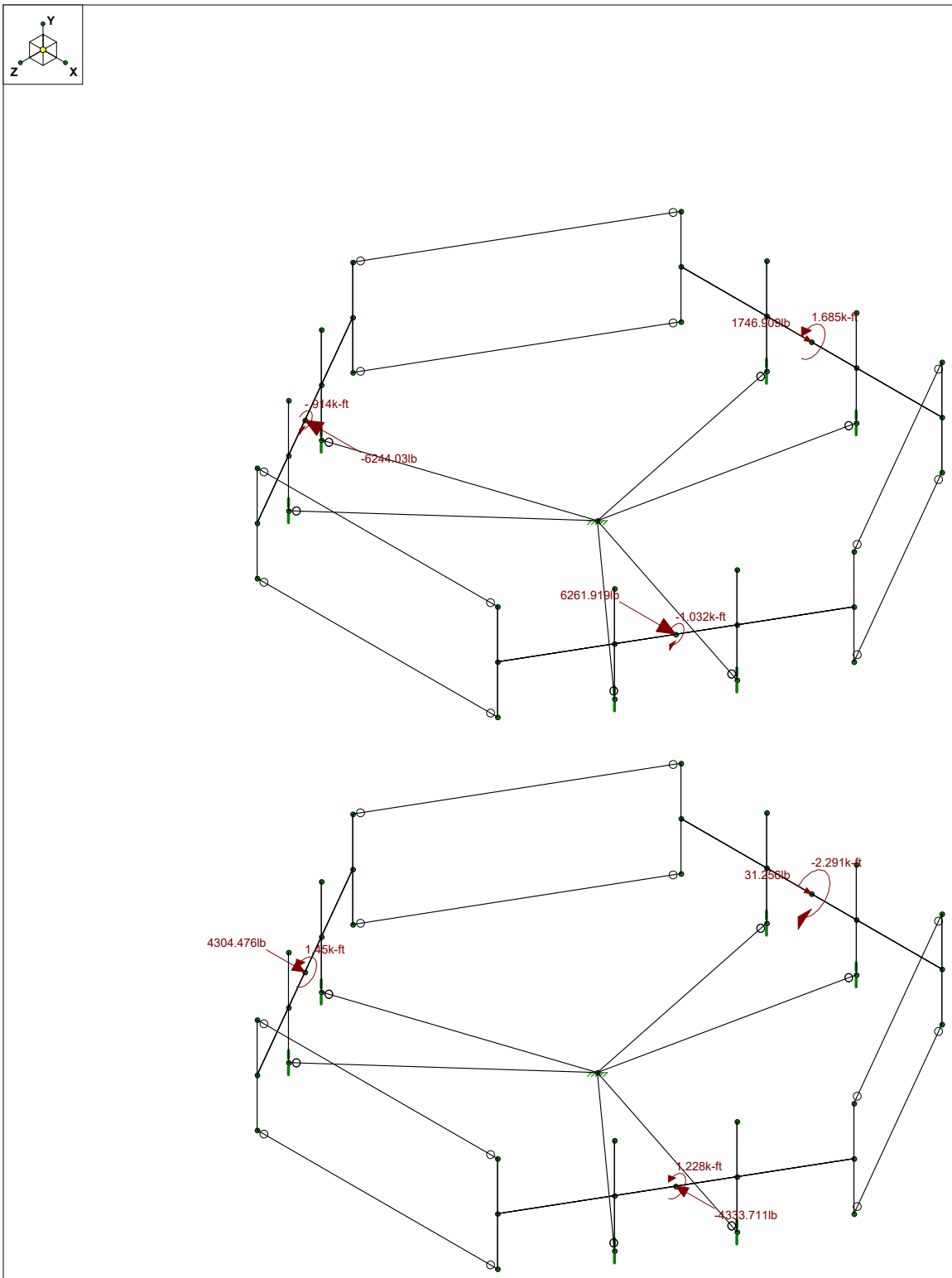
Envelope Only Solution

Fullerton Engineering P.C.		SK - 4
GO	Collar Mount Analysis	May 31, 2022 at 9:31 AM
CTL02638	Shape	CTL02638-Collar Mount Analysis.r3d



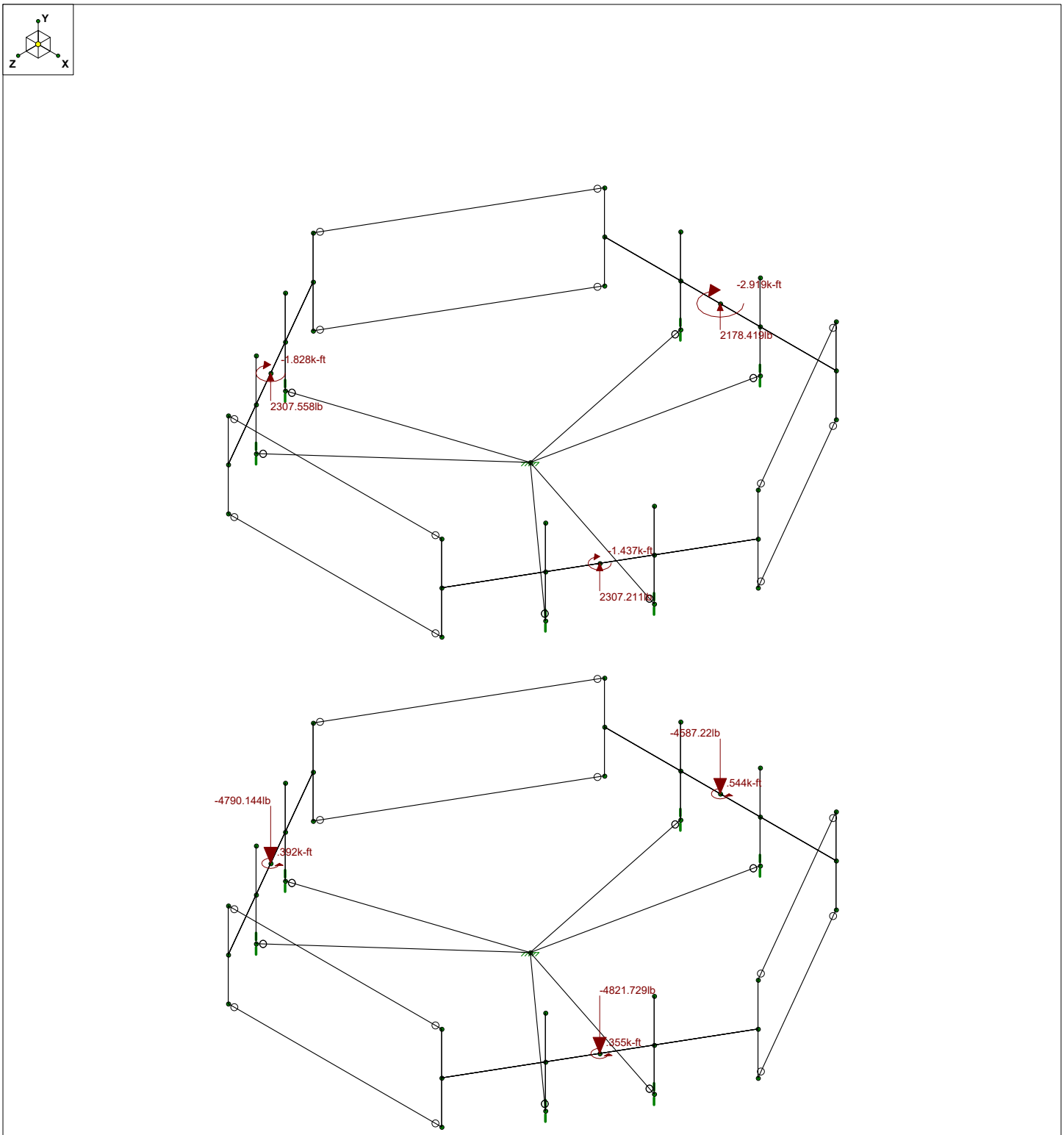
Envelope Only Solution

Fullerton Engineering P.C.		SK - 5
GO	Collar Mount Analysis	May 31, 2022 at 9:31 AM
CTL02638	Nodes	CTL02638-Collar Mount Analysis.r3d



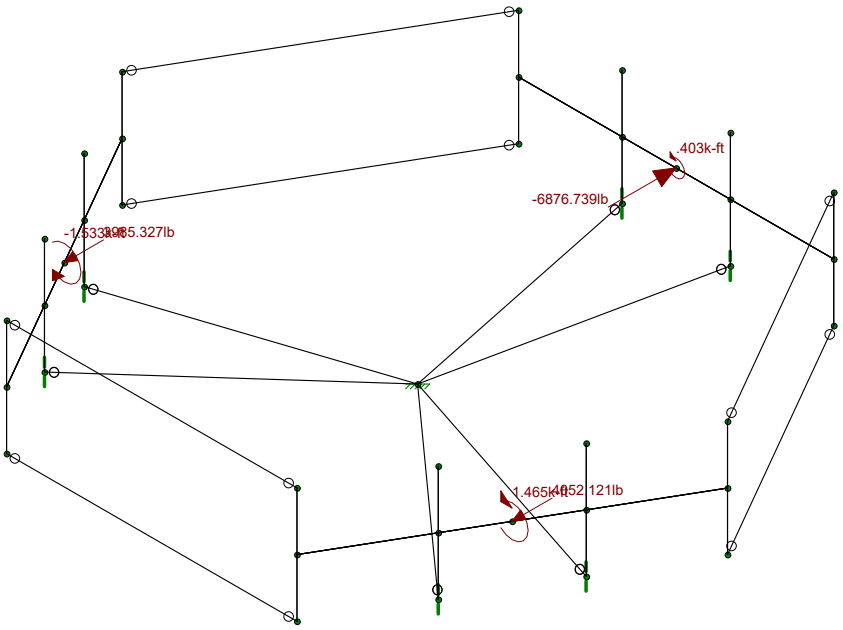
Loads: BLC 1, Max X
Envelope Only Solution

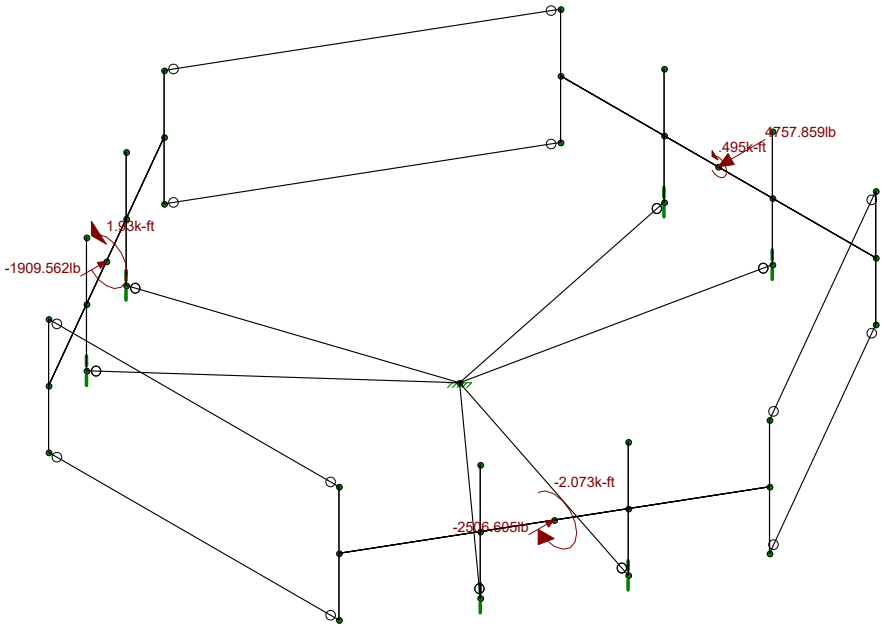
Fullerton Engineering P.C.		SK - 6
GO	Collar Mount Analysis	May 31, 2022 at 9:32 AM
CTL02638	Max X Reactions	CTL02638-Collar Mount Analysis.r3d



Loads: BLC 2, Max Y
Envelope Only Solution

Fullerton Engineering P.C.		SK - 7
GO	Collar Mount Analysis	May 31, 2022 at 9:32 AM
CTL02638	Max Y Reactions	CTL02638-Collar Mount Analysis.r3d





Loads: BLC 3, Max Z
Envelope Only Solution

Fullerton Engineering P.C.		SK - 8
GO	Collar Mount Analysis	May 31, 2022 at 9:32 AM
CTL02638	Max Z Reactions	CTL02638-Collar Mount Analysis.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 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	None

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?	No
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 7-16
Seismic Base Elevation (in)	3090.36
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	.086
SDS	.218
S1	.054
TL (sec)	6
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 to...	Lcomp b...	L-torque[i...	Kyy	Kzz	Cb	Func...
1	M22	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
2	M23	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
3	M24	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
4	M25	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
5	M26	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
6	M27	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
7	M49	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
8	M50	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
9	M51	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
10	M52	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
11	M53	.625 Dia.	15.083			Lbyy			.65	.65		Lateral
12	M54	.625 Dia.	15.083			Lbyy			.65	.65		Lateral

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		42	407	0
3	Total General		42	407	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	.625 Dia.	12	181	.016
7	Total HR Steel		12	181	.016

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Max X	None				12				
2	Max Y	None		-1		12				

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
3	Max Z	None				12				

Load Combinations

	Description	S...	PD...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	Max Reactions	Y...	Y		1	1	2	1	3	1														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	-1764.798	1	0	1	-1160.709	1	0	1	8.194	1	0	1
2		min	-1764.798	1	0	1	-1160.709	1	0	1	8.194	1	0	1
3	N4	max	0	1	-1174.757	1	0	1	0	1	0	1	0	1
4		min	0	1	-1174.757	1	0	1	0	1	0	1	0	1
5	N5	max	0	1	-1001.037	1	0	1	0	1	0	1	0	1
6		min	0	1	-1001.037	1	0	1	0	1	0	1	0	1
7	N16	max	0	1	-976.867	1	0	1	0	1	0	1	0	1
8		min	0	1	-976.867	1	0	1	0	1	0	1	0	1
9	N17	max	0	1	-1328.066	1	0	1	0	1	0	1	0	1
10		min	0	1	-1328.066	1	0	1	0	1	0	1	0	1
11	N28	max	0	1	-1048.519	1	0	1	0	1	0	1	0	1
12		min	0	1	-1048.519	1	0	1	0	1	0	1	0	1
13	N29	max	0	1	-1256.068	1	0	1	0	1	0	1	0	1
14		min	0	1	-1256.068	1	0	1	0	1	0	1	0	1
15	N38	max	-2.021	1	0	1	-341.692	1	0	1	-1.818	1	0	1
16		min	-2.021	1	0	1	-341.692	1	0	1	-1.818	1	0	1
17	N41	max	0	1	3418.302	1	0	1	0	1	0	1	0	1
18		min	0	1	3418.302	1	0	1	0	1	0	1	0	1
19	N42	max	0	1	1171.542	1	0	1	0	1	0	1	0	1
20		min	0	1	1171.542	1	0	1	0	1	0	1	0	1
21	N53	max	0	1	3351.785	1	0	1	0	1	0	1	0	1
22		min	0	1	3351.785	1	0	1	0	1	0	1	0	1
23	N54	max	0	1	1440.984	1	0	1	0	1	0	1	0	1
24		min	0	1	1440.984	1	0	1	0	1	0	1	0	1
25	N65	max	0	1	2203.548	1	0	1	0	1	0	1	0	1
26		min	0	1	2203.548	1	0	1	0	1	0	1	0	1
27	N66	max	0	1	2620.805	1	0	1	0	1	0	1	0	1
28		min	0	1	2620.805	1	0	1	0	1	0	1	0	1
29	Totals:	max	-1766.819	1	7421.651	1	-1502.401	1						
30		min	-1766.819	1	7421.651	1	-1502.401	1						

Stress ratio <1.0, members are adequate

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M52	.625 Dia.	.076	7.542	1	.001	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
2	M49	.625 Dia.	.070	7.542	1	.001	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
3	M53	.625 Dia.	.062	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
4	M25	.625 Dia.	.008	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
5	M26	.625 Dia.	.005	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
6	M22	.625 Dia.	.003	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
7	M27	.625 Dia.	.002	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
8	M23	.625 Dia.	.002	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
9	M51	.625 Dia.	.002	7.542	1	.001	0		1	8079....	9940.19	.104	.104	...	H1-1b
10	M54	.625 Dia.	.002	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b
11	M50	.625 Dia.	.002	7.542	1	.001	15.083		1	8079....	9940.19	.104	.104	...	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
12	M24	.625 Dia.	.002	7.542	1	.000	15.083		1	8079....	9940.19	.104	.104	...	H1-1b

Stress ratio <1.0, member is adequate

ANTENNA MOUNT MAPPING CHECKLIST

Mount Detail	
Mount Type	Platform
Mount Model Number	
If RT, then how is it attached	
If WT, then how is it attached	

Mount Mapping Detail	
Material condition (discoloration, cracks, pitting)	Good
Mfg. drawing, cutsheet, spec. available?	No
Date of mount mapping (if one exists)	4/11/2022
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	CONNECTICUT
PACE Project ID	MRCTB054248/MRCTB055469/MRCTB056066 MRCTB055837/MRCTB056148
Site Name	Stratford Oronoque Road
City, State	Stratford, CT
RFDS Version Number	2
Initiative (list mult., if applicable)	5G NR CBAN + DoD + 5C Add +5G NR 1DR-1
Tower Owner	
SA Vendor	
A&E firm (for structural analysis)	
A&E firm (for mapping, if different)	
Last amendment date or last site visit	
Is a site audit required on this project	

Site Information	
Original Lease Date	
FA Code	10152336
Tower Type	Monopole
Tower Height (Ft)	150
AT&T Rad Center # 1	121
AT&T Rad Center # 2	

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	Model	Height	Approz Az	mount location
Antennas	CCI TPA65R-BU8DA-K	121'-0"	30°/150°/270°	A2/B2/C2
Antennas	Ericsson AIR 6449 B77D	121'-0"	30°/150°/270°	A3/B3/C3
Antennas	Ericsson AIR 6419 B77G	121'-0"	30°/150°/270°	A3/B3/C3
Antennas	Kathrein 800-10966	121'-0"	30°/150°/270°	A4/B4/C4
RRU	Ericsson RRUS-4478 B14	121'-0"	N/A	A2/B2/C2
RRU	Ericsson RRUS-8843 B2/B66A	121'-0"	N/A	A2/B2/C2
RRU	Ericsson RRUS-4449 B5/B12	121'-0"	N/A	A4/B4/C4
RRU	Ericsson RRUS-32 B30	121'-0"	N/A	A4/B4/C4
TMA				
Coax				
RET (not imbedded in antenna)				
DC Cable				
Fiber Cable				
Squid	Raycap DC6-48-60-18-8F	121'-0"	N/A	Standoff

Comments

STRUCTURAL ANALYSIS REPORT

STRUCTURE: MONOPOLE

PREPARED FOR: SMARTLINK

CARRIER: AT&T

SITE NUMBER : CTL02638

FA NUMBER : 10152336

SITE LOCATION:
200 Oronoque Lane
Stratford, CT 06614
N41.2514110, W73.1171510

DATE: May 2, 2022

RESULTS
PASS (MAX STRESS RATIO: 44.3%)

Barbara T. Kotecki, P.E.

FULLERTON
NETWORK INTEGRITY STARTS HERE

Fullerton Engineering, P.C.
1100 E. Woodfield Road, Suite 500
Schaumburg, IL 60173
Tel: 847.908.8400
www.fullertonengineering.com

Project Number: 2021.0215.0011

Summary

A structural analysis was performed by Fullerton, as requested by the client, to determine the adequacy of the existing structure with the proposed appurtenance and equipment addition on the abovementioned structure. The analysis considers the tower properties, existing and proposed appurtenances, and the required loading criteria.

Conclusion

Component	% Capacity	Pass / Fail
Tower	44.3%	PASS
Anchor Rods/Base Plate	42.8%	PASS
Foundation	41.0%	PASS
Structural Rating (max from all components) = 44.3%		**PASS**

Analysis Criteria

Reference Standard:	TIA-222-H Standard	
Wind Parameters:	Basic Wind Speed:	119 mph (3-Sec gust)
	Ice Wind Speed:	50 mph (3-Sec gust)
	Design Ice Thickness:	1.00 in.
	Risk Category	II
	Exposure Category:	B
	Topographic Category:	1

Sources

The following documents for the existing structure were made available for our structural analysis.

Reference Document	Date
Structural Analysis Report by Infinigy	04/07/2019
RFDS by AT&T Version 2.00	03/07/2022
Site Visit Photos	02/09/2022

Final Proposed Appurtenance Loading Schedule

ANTENNA/EQUIPMENT				COAXIAL	
Elev. (Ft)	QTY.	MANUFACTURER/MODEL	MOUNT TYPE	QTY.	SIZE/TYPE.
121.0	3	(N) CCIAntennas TPA65R-BU6DA-K	Low Profile Platform	6	(E) DC Cables
	3	(N) Ericsson AIR 6449 B77D + AIR 6419 B77G Stacked		3	(E) Fiber Cables
	3	(N) CCIAntennas DMP65R-BU8DA		3	(E) RET Cables
	3	(N) Ericsson Radio 4478 B14			
	3	(N) Ericsson Radio 8843 B2/B66A			
	3	(E) Ericsson Radio 4449 B5/B12			
	3	(E) Ericsson RRUS-32 B30			
	3	(E) Raycap DC6-48-60-18-8F			

(E) denotes existing loading
(N) denotes proposed loading

Results

Tower

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	150 - 97.25	Pole	TP31.76x20x0.25	1	-8410.51	1416120.00	30.3	Pass
L2	97.25 - 48.25	Pole	TP42.19x30.2568x0.3125	2	-16486.60	2352270.00	43.0	Pass
L3	48.25 - 1	Pole	TP52.1x40.2267x0.375	3	-30427.40	3601590.00	44.3	Pass
							Summary	
						Pole (L3)	44.3	Pass
						Base Plate	42.8	Pass
						RATING =	**44.3**	**Pass**

Foundation

Components	%Capacity	PASS/FAIL
ANCHOR RODS/BASE PLATE	42.8%	PASS
FOUNDATION	41.0%	PASS

Assumptions

This analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. The analysis is based solely on the information supplied, and the results, in turn, are only as accurate as data extracted from this information. Fullerton has been instructed by the client to assume the information supplied is accurate, and Fullerton has made no independent determination of its accuracy. The exception to the previous statement is if Fullerton has been contracted by the client to provide an independent structural mapping report of the tower and related appurtenances, in which case Fullerton has made an independent determination of the accuracy of the information resulting from the mapping report.

- The tower member sizes and geometry are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and stated in the materials section.
- The existing tower is assumed to have been properly maintained in accordance with the TIA/EIA standard and/or its original manufacturer's recommendations. The existing tower is assumed to be in good condition with no structural defects and with no deterioration to its member capacities.
- The antenna configuration is as supplied and/or stated in the analysis section. It is assumed to be complete and accurate. All antennas, mounts, remote radios, cables, and cable supports are assumed to be properly installed and supported as per the manufacturer's requirements.
- The antennas, mounts, remote radios, cables, and cable supports, and lines stated in the appurtenance loading schedule represent Fullerton's understanding of the overall antenna configuration. If the actual configuration is different than above, then this analysis is invalid. Please refer to this report for the projected wind areas used in the calculations for antennas and mounts. If variations or discrepancies are identified, please inform Fullerton.
- Some assumptions are made regarding antenna and mount sizes and their projected areas based on a best interpretation of the data supplied and a best knowledge of antenna type and industry practice.
- The existing foundation is assumed to be in good condition with no structural defects and with no deterioration to its member capacities.
- The soil parameters are as per data supplied, or as assumed, and stated in the calculations.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per date supplied/ available, to be properly installed and to be fully effective.

Scope and Limitations

The engineering services rendered by Fullerton Engineering, P.C. (Fullerton) in connection with this structural analysis are limited to an analysis of the structure, size, and capacity of its members. Fullerton does not analyze the fabrication, including welding and connection capacities, except as included in this report.

The information and conclusions contained in this report were determined by application of the current engineering standards and analysis procedures and formulae, and Fullerton assumes no obligation to revise any of the information or conclusions contained in this report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

Fullerton makes no warranties, expressed, or implied in connection with this report and disclaims any liability arising from original design, material, fabrication, and erection deficiencies or the “as-built” condition of this tower.

Installation procedures are not within the scope of this report and should be performed and evaluated by a competent tower erection contractor.

Structural Calculations

Tower Analysis Summary Form

General Info

Site Name	STRATFORD ORONOQUE ROAD
Site Number	CTL02638
FA Number	10152336
Date of Analysis	5/2/2022
Company Performing Evaluation	Fullerton Engineering, P.C.

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (GT, SST, MP)	MP	
Tower Height (Top of Steel)	150'-0"	
Tower Manufacturer	N/A	
Tower Model	N/A	
Tower Design	N/A	
Foundation Design	N/A	
Geotech Report	N/A	
No Climb Site Visit	N/A	
Previous Structural Analysis	Infinigy	4/7/2019
Foundation Mapping	N/A	

Design Parameters	
Design Code Used	2015 IBC TIA-222-H
Location of Tower (County, State)	Fairfield, CT
Basic Wind Speed (mph)	119 (3-second gust)
Ice Thickness (in)	1
Structure Classification (I, II, III)	II
Exposure Category (B, C, D)	B
Topographic Category (1 to 5)	1

Analysis Results (% Maximum Usage)

Existing/Reserved + Proposed Condition	
Tower (%)	44.3%
Anchor Rods (%)	42.8%
Base Plate (%)	
Foundation (%)	41.0%
Foundation Adequate?	Yes

Steel Yield Strength (ksi)

Pole	65
Anchor Bolts	81
Base Plate	50

Note: Material grade assumed based on preferred material specifications.

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T	121	121	3	RRH	Ericsson	4449 B5/B12		1	N/A	Platform w/ Handrails	6	DC	3/4"	Internal
AT&T	121	121	3	RRH	Ericsson	RRUS-32 B30				Platform w/ Handrails	3	Fiber	1/2"	Internal
AT&T	121	121	3	Squid	Raycap	DC6-48-60-18-8F				Platform w/ Handrails	3	RET	7/16"	Internal
Unknown	149	159	2	Omni	N/A	N/A		2	N/A	Standoff Mount	3	Hybrid	1-5/8"	Internal
Unknown	149	153	2	Omni	N/A	N/A		2	N/A	Standoff Mount	3	Hybrid	1-5/8"	Internal
Unknown	133	138	2	Omni	N/A	N/A		2	N/A	Standoff Mount				
Unknown	133	137	2	Omni	N/A	N/A		2	N/A	Standoff Mount				

Note: The existing loading shall be re-used, in addition to the proposed loading.

Proposed Loading

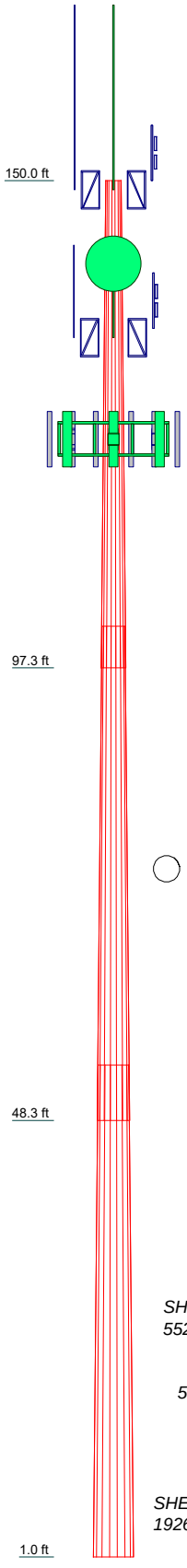
Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External
AT&T	121	121	3	Antenna	CCI	TPA65R-BU6DA-K	30/150/270							
AT&T	121	121	3	Antenna	Ericsson	AIR 6449 B77D	30/150/270							
AT&T	121	121	3	Antenna	Ericsson	AIR 6419 B77G	30/150/270							
AT&T	121	121	3	RRH	Ericsson	4478 B14								
AT&T	121	121	3	RRH	Ericsson	8843 B2/B66A								

Note: The proposed equipment shall be installed in addition to the existing/reserved loading at the same elevation.

Future Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Internal/External

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	52.75	18	0.2500	4.50	20.0000	31.7600		3650.5
2	53.50	18	0.3125	6.00	30.2568	42.1900	A572-65	6484.4
3	53.25	18	0.3750		40.2267	52.1000		9875.3
								20010.2



ALL REACTIONS ARE FACTORED

AXIAL 42804 lb

SHEAR 5524 lb

MOMENT 528248 lb-ft

TORQUE 801 lb-ft
50 mph WIND - 1.0000 in ICE

AXIAL 30438 lb

SHEAR 19266 lb

MOMENT 1886067 lb-ft

TORQUE 2887 lb-ft
REACTIONS - 119 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' Omni	149	Raycap DC6-48-60-18-8F	122
20' Omni	149	Raycap DC6-48-60-18-8F	122
8' DiPole	149	12-ft Platform w/ Handrails	122
8' DiPole	149	CCI TPA65R-BU6D	122
4' Standoff	149	CCI TPA65R-BU6D	122
4' Standoff	149	CCI TPA65R-BU6D	122
4' Standoff	149	Ericsson Air6449 B77D	122
4' Standoff	149	Ericsson Air6449 B77D	122
6' Dish w/ Shroud (HP)	141	Ericsson Air6449 B77D	122
10' Omni	133	Ericsson Air6419 B77G	122
8' DiPole	133	Ericsson Air6419 B77G	122
8' DiPole	133	Ericsson Air6419 B77G	122
4' Standoff	133	CCI DMP65R-BU8DA-K	122
4' Standoff	133	CCI DMP65R-BU8DA-K	122
4' Standoff	133	CCI DMP65R-BU8DA-K	122
4' Standoff	133	Ericsson RRUS 4478 B14	122
10' Omni	133	Ericsson RRUS 4478 B14	122
RRUS-4449 B5/B12	122	Ericsson RRUS 4478 B14	122
RRUS-4449 B5/B12	122	RRUS-8843 B2/B66A	122
RRUS-32 B30	122	RRUS-8843 B2/B66A	122
RRUS-32 B30	122	RRUS-8843 B2/B66A	122
RRUS-32 B30	122	RRUS-4449 B5/B12	122
Raycap DC6-48-60-18-8F	122		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 44.3%

Fullerton Engineering, P.C.
1100 E. Woodfield Road, Suite 500
Schaumburg, IL 60173
Phone: (847) 908-8400
FAX: (847) 413-4733

Job: *CTL02638*			
Project:			
Client: Smartlink/AT&T	Drawn by: LA		App'd:
Code: TIA-222-H	Date: 06/02/22		Scale: NTS
Path: P:\Dept 4000\SMLINK\SMLINK-ATT-NEWEN 8\CTL02638\Structural\Structural Analysis\Analysis\TNX\CTL02638 - tnxTower.eri			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Tower base elevation above sea level: 259.00 ft.
Basic wind speed of 119 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals		Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-97.25	52.75	4.50	18	20.0000	31.7600	0.2500	1.0000	A572-65 (65 ksi)
L2	97.25-48.25	53.50	6.00	18	30.2568	42.1900	0.3125	1.2500	A572-65 (65 ksi)
L3	48.25-1.00	53.25		18	40.2267	52.1000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	20.2700	15.6716	772.2994	7.0112	10.1600	76.0137	1545.6150	7.8373	3.0800	12.32
	32.2114	25.0032	3136.3866	11.1861	16.1341	194.3951	6276.9002	12.5040	5.1498	20.599
L2	31.6945	29.7010	3364.6191	10.6302	15.3704	218.9019	6733.6654	14.8533	4.7752	15.281
	42.7926	41.5372	9203.1529	14.8665	21.4325	429.4013	18418.4155	20.7726	6.8754	22.001
L3	42.1479	47.4335	9517.3496	14.1474	20.4352	465.7340	19047.2224	23.7212	6.4199	17.12
	52.8459	61.5657	20810.2424	18.3624	26.4668	786.2772	41647.8674	30.7887	8.5096	22.692

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.00-97.25				1	1	1			
L2 97.25-48.25				1	1	1			
L3 48.25-1.00				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A325X
Anchor bolt size	2.2500 in
Number of bolts	14
Embedment length	84.0000 in
f'_c	3 ksi
Grout space	2.0000 in
Base plate grade	A572-50
Base plate thickness	2.5000 in
Bolt circle diameter	58.5000 in
Outer diameter	64.5000 in
Inner diameter	50.5000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Step Rungs 3/4	C	No	Surface Ar (CaAa)	150.00 - 1.00	1	1	0.000 0.000	0.7500		0.48

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 plf
Safety Line 3/8	C	No	No	CaAa (Out Of Face)	150.00 - 1.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
***									
1-5/8" Hybrid	C	No	No	Inside Pole	150.00 - 2.00	6	No Ice	0.00	1.20
							1/2" Ice	0.00	1.20
							1" Ice	0.00	1.20
***									
3/4" DC power cable	C	No	No	Inside Pole	122.00 - 2.00	6	No Ice	0.00	0.40
							1/2" Ice	0.00	0.40
							1" Ice	0.00	0.40
1/2" Fiber	C	No	No	Inside Pole	122.00 - 2.00	3	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
RET Cable	C	No	No	Inside Pole	122.00 - 2.00	3	No Ice	0.00	0.25
							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25

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 lb
L1	150.00-97.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.956	1.978	505.82
L2	97.25-48.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.675	1.838	563.50
L3	48.25-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.544	1.772	532.58

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 lb
L1	150.00-97.25	A	1.140	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	15.980	14.002	708.35
L2	97.25-48.25	A	1.081	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	14.844	13.007	751.63
L3	48.25-1.00	A	0.969	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	13.762	11.991	701.05

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-97.25	-0.2459	0.7264	-0.8697	1.6814
L2	97.25-48.25	-0.2508	0.7357	-0.9362	1.7994
L3	48.25-1.00	-0.2533	0.7407	-0.9376	1.8039

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Step Rungs 3/4	97.25 - 150.00	1.0000	1.0000
L2	2	Step Rungs 3/4	48.25 - 97.25	1.0000	1.0000
L3	2	Step Rungs 3/4	1.00 - 48.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
20' Omni	A	From Face	4.00 0.00	90.0000	149.00	No Ice 1/2" Ice	4.00 6.03	4.00 6.03	40.00 70.77

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 lb
			10.00			1" Ice	8.07	8.07	114.12
20' Omni	C	From Face	4.00	30.0000	149.00	No Ice	4.00	4.00	40.00
			0.00			1/2" Ice	6.03	6.03	70.77
			10.00			1" Ice	8.07	8.07	114.12
8' DiPole	B	From Face	4.00	90.0000	149.00	No Ice	1.60	1.60	20.00
			0.00			1/2" Ice	2.42	2.42	32.45
			4.00			1" Ice	3.24	3.24	50.14
8' DiPole	B	From Face	4.00	-90.0000	149.00	No Ice	1.60	1.60	20.00
			0.00			1/2" Ice	2.42	2.42	32.45
			4.00			1" Ice	3.24	3.24	50.14
10' Omni	A	From Face	4.00	90.0000	133.00	No Ice	3.19	3.19	53.25
			0.00			1/2" Ice	4.52	4.52	82.03
			5.00			1" Ice	5.87	5.87	118.76
10' Omni	C	From Face	4.00	30.0000	133.00	No Ice	3.19	3.19	53.25
			0.00			1/2" Ice	4.52	4.52	82.03
			5.00			1" Ice	5.87	5.87	118.76
8' DiPole	B	From Face	4.00	90.0000	133.00	No Ice	1.60	1.60	20.00
			0.00			1/2" Ice	2.42	2.42	32.45
			4.00			1" Ice	3.24	3.24	50.14
8' DiPole	B	From Face	4.00	-90.0000	133.00	No Ice	1.60	1.60	20.00
			0.00			1/2" Ice	2.42	2.42	32.45
			4.00			1" Ice	3.24	3.24	50.14
4' Standoff	A	From Face	2.00	0.0000	149.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	B	From Face	2.00	0.0000	149.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	C	From Face	2.00	0.0000	149.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	C	From Face	2.00	30.0000	149.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	A	From Face	2.00	0.0000	133.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	B	From Face	2.00	0.0000	133.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	C	From Face	2.00	0.0000	133.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
4' Standoff	C	From Face	2.00	30.0000	133.00	No Ice	3.41	3.41	80.00
			0.00			1/2" Ice	4.47	4.47	104.00
			0.00			1" Ice	5.53	5.53	128.00
***									
RRUS-4449 B5/B12	A	From Face	4.00	0.0000	122.00	No Ice	1.64	1.30	73.00
			0.00			1/2" Ice	1.80	1.45	90.19
			0.00			1" Ice	1.97	1.60	110.08
RRUS-4449 B5/B12	B	From Face	4.00	0.0000	122.00	No Ice	1.64	1.30	73.00
			0.00			1/2" Ice	1.80	1.45	90.19
			0.00			1" Ice	1.97	1.60	110.08
RRUS-4449 B5/B12	C	From Face	4.00	0.0000	122.00	No Ice	1.64	1.30	73.00
			0.00			1/2" Ice	1.80	1.45	90.19
			0.00			1" Ice	1.97	1.60	110.08
RRUS-32 B30	A	From Face	4.00	0.0000	122.00	No Ice	2.74	1.67	60.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1/2" Ice	2.96	1.86	81.11
			0.00				1" Ice	3.19	2.05	105.42
RRUS-32 B30	B	From Face	4.00		0.0000	122.00	No Ice	2.74	1.67	60.00
			0.00				1/2" Ice	2.96	1.86	81.11
			0.00				1" Ice	3.19	2.05	105.42
RRUS-32 B30	C	From Face	4.00		0.0000	122.00	No Ice	2.74	1.67	60.00
			0.00				1/2" Ice	2.96	1.86	81.11
			0.00				1" Ice	3.19	2.05	105.42
Raycap DC6-48-60-18-8F	A	From Face	4.00		0.0000	122.00	No Ice	0.83	0.83	22.00
			0.00				1/2" Ice	1.34	1.34	37.91
			0.00				1" Ice	1.52	1.52	56.21
Raycap DC6-48-60-18-8F	B	From Face	4.00		0.0000	122.00	No Ice	0.83	0.83	22.00
			0.00				1/2" Ice	1.34	1.34	37.91
			0.00				1" Ice	1.52	1.52	56.21
Raycap DC6-48-60-18-8F	C	From Face	4.00		0.0000	122.00	No Ice	0.83	0.83	22.00
			0.00				1/2" Ice	1.34	1.34	37.91
			0.00				1" Ice	1.52	1.52	56.21
12-ft Platform w/ Handrails	C	None			0.0000	122.00	No Ice	45.00	45.00	500.00
							1/2" Ice	53.00	53.00	600.00
							1" Ice	63.00	63.00	700.00
Proposed										
CCI TPA65R-BU6D	A	From Face	4.00		0.0000	122.00	No Ice	15.53	7.21	124.35
			0.00				1/2" Ice	16.16	8.39	228.80
			0.00				1" Ice	16.75	9.28	342.08
CCI TPA65R-BU6D	B	From Face	4.00		0.0000	122.00	No Ice	15.53	7.21	124.35
			0.00				1/2" Ice	16.16	8.39	228.80
			0.00				1" Ice	16.75	9.28	342.08
CCI TPA65R-BU6D	C	From Face	4.00		0.0000	122.00	No Ice	15.53	7.21	124.35
			0.00				1/2" Ice	16.16	8.39	228.80
			0.00				1" Ice	16.75	9.28	342.08
Ericsson Air6449 B77D	A	From Face	4.00		0.0000	122.00	No Ice	4.03	2.15	81.60
			0.00				1/2" Ice	4.29	2.36	111.21
			0.00				1" Ice	4.56	2.57	144.55
Ericsson Air6449 B77D	B	From Face	4.00		0.0000	122.00	No Ice	4.03	2.15	81.60
			0.00				1/2" Ice	4.29	2.36	111.21
			0.00				1" Ice	4.56	2.57	144.55
Ericsson Air6449 B77D	C	From Face	4.00		0.0000	122.00	No Ice	4.03	2.15	81.60
			0.00				1/2" Ice	4.29	2.36	111.21
			0.00				1" Ice	4.56	2.57	144.55
Ericsson Air6419 B77G	A	From Face	4.00		0.0000	122.00	No Ice	3.80	1.94	77.00
			0.00				1/2" Ice	4.05	2.14	104.86
			0.00				1" Ice	4.31	2.34	136.30
Ericsson Air6419 B77G	B	From Face	4.00		0.0000	122.00	No Ice	3.80	1.94	77.00
			0.00				1/2" Ice	4.05	2.14	104.86
			0.00				1" Ice	4.31	2.34	136.30
Ericsson Air6419 B77G	C	From Face	4.00		0.0000	122.00	No Ice	3.80	1.94	77.00
			0.00				1/2" Ice	4.05	2.14	104.86
			0.00				1" Ice	4.31	2.34	136.30
CCI DMP65R-BU8DA-K	A	From Face	4.00		0.0000	122.00	No Ice	17.87	8.12	95.70
			0.00				1/2" Ice	18.50	8.72	193.28
			0.00				1" Ice	19.14	9.32	299.13
CCI DMP65R-BU8DA-K	B	From Face	4.00		0.0000	122.00	No Ice	17.87	8.12	95.70
			0.00				1/2" Ice	18.50	8.72	193.28
			0.00				1" Ice	19.14	9.32	299.13
CCI DMP65R-BU8DA-K	C	From Face	4.00		0.0000	122.00	No Ice	17.87	8.12	95.70
			0.00				1/2" Ice	18.50	8.72	193.28
			0.00				1" Ice	19.14	9.32	299.13

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 lb
Ericsson RRUS 4478 B14	A	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	1.06 1.20 1.34	59.90 75.78 94.29
Ericsson RRUS 4478 B14	B	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	1.06 1.20 1.34	59.90 75.78 94.29
Ericsson RRUS 4478 B14	C	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	1.06 1.20 1.34	59.90 75.78 94.29
RRUS-8843 B2/B66A	A	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	1.35 1.50 1.65	72.00 89.60 109.91
RRUS-8843 B2/B66A	B	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	1.35 1.50 1.65	72.00 89.60 109.91
RRUS-8843 B2/B66A	C	From Face	4.00 0.00 0.00	0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	1.35 1.50 1.65	72.00 89.60 109.91

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 lb
6' Dish w/ Shroud (HP)	C	Paraboloid w/Shroud (HP)	From Face	1.00 0.00 0.00	0.0000		141.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.05 29.80	350.00 500.00 650.00

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 150.00-97.25	122.02	1.046	36	115.350	A B C	0.000 0.000 0.000	115.350 115.350 115.350	115.350	100.00 100.00 100.00	0.000 0.000 3.956	0.000 0.000 1.978
L2 97.25-48.25	72.13	0.9	31	152.078	A B C	0.000 0.000 0.000	152.078 152.078 152.078	152.078	100.00 100.00 100.00	0.000 0.000 3.675	0.000 0.000 1.838
L3 48.25-1.00	24.06	0.7	25	187.019	A B C	0.000 0.000 0.000	187.019 187.019 187.019	187.019	100.00 100.00 100.00	0.000 0.000 3.544	0.000 0.000 1.772

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150.00-97.25	122.02	1.046	6	1.1397	125.370	A	0.000	125.370	125.370	100.00	0.000	0.000
						B	0.000	125.370		100.00	0.000	0.000
						C	0.000	125.370		100.00	15.980	14.002
L2 97.25-48.25	72.13	0.9	5	1.0813	161.386	A	0.000	161.386	161.386	100.00	0.000	0.000
						B	0.000	161.386		100.00	0.000	0.000
						C	0.000	161.386		100.00	14.844	13.007
L3 48.25-1.00	24.06	0.7	4	0.9689	195.534	A	0.000	195.534	195.534	100.00	0.000	0.000
						B	0.000	195.534		100.00	0.000	0.000
						C	0.000	195.534		100.00	13.762	11.991

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	122.02	1.046	8	115.350	A	0.000	115.350	115.350	100.00	0.000	0.000
150.00-97.25					B	0.000	115.350		100.00	0.000	0.000
					C	0.000	115.350		100.00	3.956	1.978
L2 97.25-48.25	72.13	0.9	7	152.078	A	0.000	152.078	152.078	100.00	0.000	0.000
					B	0.000	152.078		100.00	0.000	0.000
					C	0.000	152.078		100.00	3.675	1.838
L3 48.25-1.00	24.06	0.7	6	187.019	A	0.000	187.019	187.019	100.00	0.000	0.000
					B	0.000	187.019		100.00	0.000	0.000
					C	0.000	187.019		100.00	3.544	1.772

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	36	1	1	115.350	3376.47	64.01	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	31	1	1	152.078	3792.42	77.40	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			
L3 48.25-1.00	532.58	9875.25	A	1	0.73	25	1	1	187.019	3729.39	78.93	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	764368.22	10898.28		

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
									lb-ft			

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	36	1	1	115.350	3376.47	64.01	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	31	1	1	152.078	3792.42	77.40	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			
L3 48.25-1.00	532.58	9875.25	A	1	0.73	25	1	1	187.019	3729.39	78.93	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	764368.22 lb-ft	10898.28		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	36	1	1	115.350	3376.47	64.01	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	31	1	1	152.078	3792.42	77.40	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			
L3 48.25-1.00	532.58	9875.25	A	1	0.73	25	1	1	187.019	3729.39	78.93	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	764368.22 lb-ft	10898.28		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	708.35	5655.57	A	1	1.2	6	1	1	125.370	1137.39	21.56	C
150.00-97.25			B	1	1.2		1	1	125.370			
			C	1	1.2		1	1	125.370			
L2	751.63	8957.04	A	1	1.2	5	1	1	160.909	1222.69	24.95	C
97.25-48.25			B	1	1.2		1	1	160.909			
			C	1	1.2		1	1	160.909			
L3 48.25-1.00	701.05	12576.41	A	1	1.2	4	1	1	194.649	1169.09	24.74	C
			B	1	1.2		1	1	194.649			
			C	1	1.2		1	1	194.649			
Sum Weight:	2161.03	27189.02						OTM	251573.65 lb-ft	3529.17		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	708.35	5655.57	A	1	1.2	6	1	1	125.370	1137.39	21.56	C
150.00-97.25			B	1	1.2		1	1	125.370			
			C	1	1.2		1	1	125.370			
L2	751.63	8957.04	A	1	1.2	5	1	1	160.909	1222.69	24.95	C
97.25-48.25			B	1	1.2		1	1	160.909			
			C	1	1.2		1	1	160.909			
L3 48.25-1.00	701.05	12576.41	A	1	1.2	4	1	1	194.649	1169.09	24.74	C
			B	1	1.2		1	1	194.649			
			C	1	1.2		1	1	194.649			
Sum Weight:	2161.03	27189.02						OTM	251573.65 lb-ft	3529.17		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	708.35	5655.57	A	1	1.2	6	1	1	125.370	1137.39	21.56	C
150.00-97.25			B	1	1.2		1	1	125.370			
			C	1	1.2		1	1	125.370			
L2	751.63	8957.04	A	1	1.2	5	1	1	160.909	1222.69	24.95	C
97.25-48.25			B	1	1.2		1	1	160.909			
			C	1	1.2		1	1	160.909			
L3 48.25-1.00	701.05	12576.41	A	1	1.2	4	1	1	194.649	1169.09	24.74	C
			B	1	1.2		1	1	194.649			
			C	1	1.2		1	1	194.649			
Sum Weight:	2161.03	27189.02						OTM	251573.65 lb-ft	3529.17		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	8	1	1	115.350	768.01	14.56	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	7	1	1	152.078	862.62	17.60	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			
L3 48.25-1.00	532.58	9875.25	A	1	0.73	6	1	1	187.019	848.29	17.95	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	173862.74 lb-ft	2478.92		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	8	1	1	115.350	768.01	14.56	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	7	1	1	152.078	862.62	17.60	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			
L3 48.25-1.00	532.58	9875.25	A	1	0.73	6	1	1	187.019	848.29	17.95	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	173862.74 lb-ft	2478.92		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1	505.82	3650.51	A	1	0.73	8	1	1	115.350	768.01	14.56	C
150.00-97.25			B	1	0.73		1	1	115.350			
			C	1	0.73		1	1	115.350			
L2	563.50	6484.44	A	1	0.73	7	1	1	152.078	862.62	17.60	C
97.25-48.25			B	1	0.73		1	1	152.078			
			C	1	0.73		1	1	152.078			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L3 48.25-1.00	532.58	9875.25	A	1	0.73	6	1	1	187.019	848.29	17.95	C
			B	1	0.73		1	1	187.019			
			C	1	0.73		1	1	187.019			
Sum Weight:	1601.90	20010.20						OTM	173862.74 lb-ft	2478.92		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	20010.20					
Bracing Weight	0.00					
Total Member Self-Weight	20010.20			1305.14	99.96	
Total Weight	25365.25			1305.14	99.96	
Wind 0 deg - No Ice		0.00	-19265.78	-1838562.43	99.96	-352.75
Wind 30 deg - No Ice		9174.29	-16821.44	-1611216.86	-855629.16	280.79
Wind 60 deg - No Ice		15845.49	-9996.61	-969549.59	-1475789.45	1318.02
Wind 90 deg - No Ice		18529.30	126.51	19016.77	-1736660.61	2920.59
Wind 120 deg - No Ice		15926.82	9725.51	934206.37	-1487175.50	2607.43
Wind 150 deg - No Ice		9106.51	16527.75	1572710.84	-846140.79	1550.75
Wind 180 deg - No Ice		0.00	18981.13	1801321.54	99.96	352.75
Wind 210 deg - No Ice		-9106.51	16527.75	1572710.84	846340.71	-939.77
Wind 240 deg - No Ice		-15926.82	9725.51	934206.37	1487375.43	-2254.68
Wind 270 deg - No Ice		-18529.30	126.51	19016.77	1736860.54	-2920.59
Wind 300 deg - No Ice		-15845.49	-9996.61	-969549.59	1475989.38	-1670.77
Wind 330 deg - No Ice		-9174.29	-16821.44	-1611216.86	855829.09	-891.77
Member Ice	7178.82					
Total Weight Ice	37161.09			3015.84	425.59	
Wind 0 deg - Ice		0.00	-5524.09	-507185.36	425.59	-327.08
Wind 30 deg - Ice		2676.03	-4809.65	-442423.12	-242632.78	-60.28
Wind 60 deg - Ice		4626.61	-2830.26	-261635.49	-419386.57	312.50
Wind 90 deg - Ice		5385.95	23.73	6337.83	-490436.86	773.82
Wind 120 deg - Ice		4641.86	2779.42	260548.61	-421522.14	815.26
Wind 150 deg - Ice		2663.32	4754.57	440743.03	-240853.15	629.84
Wind 180 deg - Ice		0.00	5470.70	505742.55	425.59	327.08
Wind 210 deg - Ice		-2663.32	4754.57	440743.03	241704.33	-63.32
Wind 240 deg - Ice		-4641.86	2779.42	260548.61	422373.32	-488.18
Wind 270 deg - Ice		-5385.95	23.73	6337.83	491288.05	-773.82
Wind 300 deg - Ice		-4626.61	-2830.26	-261635.49	420237.76	-639.58
Wind 330 deg - Ice		-2676.03	-4809.65	-442423.12	243483.97	-506.24
Total Weight	25365.25			1305.14	99.96	
Wind 0 deg - Service		0.00	-4386.32	-417825.29	57.27	-80.24
Wind 30 deg - Service		2088.85	-3829.78	-366046.31	-194836.77	63.87
Wind 60 deg - Service		3607.79	-2275.89	-219909.74	-336081.37	299.80
Wind 90 deg - Service		4218.80	28.78	5199.38	-395486.07	664.31
Wind 120 deg - Service		3626.29	2214.23	213618.27	-338671.23	593.08
Wind 150 deg - Service		2073.43	3762.98	359035.43	-192678.55	352.73
Wind 180 deg - Service		0.00	4321.58	411102.18	57.27	80.24
Wind 210 deg - Service		-2073.43	3762.98	359035.43	192793.10	-213.76
Wind 240 deg - Service		-3626.29	2214.23	213618.27	338785.78	-512.85
Wind 270 deg - Service		-4218.80	28.78	5199.38	395600.61	-664.31
Wind 300 deg - Service		-3607.79	-2275.89	-219909.74	336195.92	-380.03

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 330 deg - Service		-2088.85	-3829.78	-366046.31	194951.32	-202.84

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
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

Comb. No.	Description
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	150 - 97.25	Pole	Max Tension	27	0.00	-0.03	-0.36
			Max. Compression	26	-15064.64	241.22	-2712.85
			Max. Mx	20	-8484.62	283780.96	-6518.28
			Max. My	2	-8410.51	78.90	311939.89
			Max. Vy	20	-11075.34	283780.96	-6518.28
			Max. Vx	2	-11839.71	78.90	311939.89
			Max. Torque	21			2794.23
L2	97.25 - 48.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25692.19	339.11	-3067.01
			Max. Mx	20	-16526.92	895609.34	-12913.83
			Max. My	2	-16486.56	100.18	960037.53
			Max. Vy	20	-14693.38	895609.34	-12913.83
			Max. Vx	2	-15454.51	100.18	960037.53
			Max. Torque	21			2835.77
L3	48.25 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42804.22	463.42	-3449.42
			Max. Mx	20	-30428.42	1781687.95	-19890.26
			Max. My	2	-30427.43	124.01	1886066.63
			Max. Vy	20	-18545.51	1781687.95	-19890.26
			Max. Vx	2	-19282.94	124.01	1886066.63
			Max. Torque	21			2886.89

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	33	42804.22	0.00	-5470.74
	Max. H_x	20	30438.30	18529.30	-126.51
	Max. H_z	2	30438.30	0.00	19265.78
	Max. M_x	2	1886066.63	0.00	19265.78
	Max. M_z	8	1781438.56	-18529.30	-126.51
	Max. Torsion	21	2886.92	18529.30	-126.51
	Min. Vert	11	22828.72	-15926.82	-9725.51
	Min. H_x	8	30438.30	-18529.30	-126.51
	Min. H_z	14	30438.30	0.00	-18981.13
	Min. M_x	14	-1848322.55	0.00	-18981.13
	Min. M_z	20	-1781687.96	18529.30	-126.51
	Min. Torsion	9	-2886.91	-18529.30	-126.51

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead Only	25365.25	0.00	0.00	1320.54	100.85	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	30438.30	-0.00	-19265.78	-1886066.63	123.95	-350.52
0.9 Dead+1.0 Wind 0 deg - No Ice	22828.72	-0.00	-19265.78	-1873993.37	91.99	-350.83
1.2 Dead+1.0 Wind 30 deg - No Ice	30438.30	9174.29	-16821.44	-1652918.76	-877561.62	256.19
0.9 Dead+1.0 Wind 30 deg - No Ice	22828.72	9174.29	-16821.44	-1642364.36	-871860.83	260.16
1.2 Dead+1.0 Wind 60 deg - No Ice	30438.30	15845.49	-9996.61	-994754.93	-1513664.48	1272.93
0.9 Dead+1.0 Wind 60 deg - No Ice	22828.72	15845.49	-9996.61	-988518.26	-1503815.88	1280.09
1.2 Dead+1.0 Wind 90 deg - No Ice	30438.30	18529.30	126.51	19889.81	-1781438.56	2878.29
0.9 Dead+1.0 Wind 90 deg - No Ice	22828.72	18529.30	126.51	19323.83	-1769798.73	2886.91
1.2 Dead+1.0 Wind 120 deg - No Ice	30438.30	15926.82	9725.51	958912.13	-1525417.37	2576.15
0.9 Dead+1.0 Wind 120 deg - No Ice	22828.72	15926.82	9725.51	952132.67	-1515475.64	2583.62
1.2 Dead+1.0 Wind 150 deg - No Ice	30438.30	9106.51	16527.75	1613862.99	-867809.70	1534.13
0.9 Dead+1.0 Wind 150 deg - No Ice	22828.72	9106.51	16527.75	1602788.56	-862183.72	1538.48
1.2 Dead+1.0 Wind 180 deg - No Ice	30438.30	-0.00	18981.13	1848322.55	123.98	350.61
0.9 Dead+1.0 Wind 180 deg - No Ice	22828.72	-0.00	18981.13	1835719.01	92.02	350.91
1.2 Dead+1.0 Wind 210 deg - No Ice	30438.30	-9106.51	16527.75	1613863.52	868058.01	-926.83
0.9 Dead+1.0 Wind 210 deg - No Ice	22828.72	-9106.51	16527.75	1602789.33	862368.19	-930.68
1.2 Dead+1.0 Wind 240 deg - No Ice	30438.30	-15926.82	9725.51	958912.66	1525666.39	-2225.51
0.9 Dead+1.0 Wind 240 deg - No Ice	22828.72	-15926.82	9725.51	952133.06	1515660.45	-2232.67
1.2 Dead+1.0 Wind 270 deg - No Ice	30438.30	-18529.30	126.51	19889.80	1781687.96	-2878.30
0.9 Dead+1.0 Wind 270 deg - No Ice	22828.72	-18529.30	126.51	19323.82	1769983.82	-2886.92
1.2 Dead+1.0 Wind 300 deg - No Ice	30438.30	-15845.49	-9996.61	-994755.45	1513913.48	-1623.47
0.9 Dead+1.0 Wind 300 deg - No Ice	22828.72	-15845.49	-9996.61	-988518.65	1504000.68	-1630.95
1.2 Dead+1.0 Wind 330 deg - No Ice	30438.30	-9174.29	-16821.44	-1652919.29	877809.87	-863.31
0.9 Dead+1.0 Wind 330 deg - No Ice	22828.72	-9174.29	-16821.44	-1642364.76	872045.07	-867.82
1.2 Dead+1.0 Ice+1.0 Temp	42804.22	-0.00	0.00	3449.42	463.42	0.02
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	42804.22	-0.00	-5524.13	-528248.13	473.14	-326.06
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	42804.22	2676.05	-4809.70	-460778.79	-252758.54	-67.99
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	42804.22	4626.64	-2830.29	-272398.48	-436900.37	298.24
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	42804.22	5386.00	23.73	7021.77	-510980.12	757.41

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	42804.22	4641.90	2779.44	271976.67	-439145.63	801.08
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	42804.22	2663.34	4754.61	459734.44	-250888.57	621.34
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	42804.22	-0.00	5470.74	527453.36	473.13	326.11
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	42804.22	-2663.34	4754.61	459734.66	251834.98	-56.50
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	42804.22	-4641.90	2779.44	271976.89	440092.33	-474.98
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	42804.22	-5386.00	23.73	7021.76	511926.97	-757.39
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	42804.22	-4626.64	-2830.29	-272398.71	437847.07	-624.24
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	42804.22	-2676.05	-4809.70	-460779.02	253704.96	-496.74
Dead+Wind 0 deg - Service	25365.25	-0.00	-4386.32	-426850.71	103.46	-80.01
Dead+Wind 30 deg - Service	25365.25	2088.85	-3829.78	-373950.81	-199017.72	60.60
Dead+Wind 60 deg - Service	25365.25	3607.79	-2275.89	-224630.11	-343320.30	293.98
Dead+Wind 90 deg - Service	25365.25	4218.80	28.78	5493.24	-404045.32	658.05
Dead+Wind 120 deg - Service	25365.25	3626.29	2214.23	218492.06	-345977.93	587.93
Dead+Wind 150 deg - Service	25365.25	2073.43	3762.98	367075.30	-196803.70	349.80
Dead+Wind 180 deg - Service	25365.25	-0.00	4321.58	420270.57	103.46	80.02
Dead+Wind 210 deg - Service	25365.25	-2073.43	3762.98	367075.32	197010.64	-211.20
Dead+Wind 240 deg - Service	25365.25	-3626.29	2214.23	218492.08	346184.89	-507.92
Dead+Wind 270 deg - Service	25365.25	-4218.80	28.78	5493.24	404252.30	-658.05
Dead+Wind 300 deg - Service	25365.25	-3607.79	-2275.89	-224630.13	343527.26	-373.98
Dead+Wind 330 deg - Service	25365.25	-2088.85	-3829.78	-373950.84	199224.65	-199.18

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-25365.25	0.00	0.00	25365.25	-0.00	0.000%
2	0.00	-30438.30	-19265.78	0.00	30438.30	19265.78	0.000%
3	0.00	-22828.72	-19265.78	0.00	22828.72	19265.78	0.000%
4	9174.29	-30438.30	-16821.44	-9174.29	30438.30	16821.44	0.000%
5	9174.29	-22828.72	-16821.44	-9174.29	22828.72	16821.44	0.000%
6	15845.49	-30438.30	-9996.61	-15845.49	30438.30	9996.61	0.000%
7	15845.49	-22828.72	-9996.61	-15845.49	22828.72	9996.61	0.000%
8	18529.30	-30438.30	126.51	-18529.30	30438.30	-126.51	0.000%
9	18529.30	-22828.72	126.51	-18529.30	22828.72	-126.51	0.000%
10	15926.82	-30438.30	9725.51	-15926.82	30438.30	-9725.51	0.000%
11	15926.82	-22828.72	9725.51	-15926.82	22828.72	-9725.51	0.000%
12	9106.51	-30438.30	16527.75	-9106.51	30438.30	-16527.75	0.000%
13	9106.51	-22828.72	16527.75	-9106.51	22828.72	-16527.75	0.000%
14	0.00	-30438.30	18981.13	0.00	30438.30	-18981.13	0.000%
15	0.00	-22828.72	18981.13	0.00	22828.72	-18981.13	0.000%
16	-9106.51	-30438.30	16527.75	9106.51	30438.30	-16527.75	0.000%
17	-9106.51	-22828.72	16527.75	9106.51	22828.72	-16527.75	0.000%
18	-15926.82	-30438.30	9725.51	15926.82	30438.30	-9725.51	0.000%
19	-15926.82	-22828.72	9725.51	15926.82	22828.72	-9725.51	0.000%
20	-18529.30	-30438.30	126.51	18529.30	30438.30	-126.51	0.000%
21	-18529.30	-22828.72	126.51	18529.30	22828.72	-126.51	0.000%
22	-15845.49	-30438.30	-9996.61	15845.49	30438.30	9996.61	0.000%
23	-15845.49	-22828.72	-9996.61	15845.49	22828.72	9996.61	0.000%
24	-9174.29	-30438.30	-16821.44	9174.29	30438.30	16821.44	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
25	-9174.29	-22828.72	-16821.44	9174.29	22828.72	16821.44	0.000%
26	0.00	-42804.22	0.00	0.00	42804.22	-0.00	0.000%
27	0.00	-42804.22	-5524.09	0.00	42804.22	5524.13	0.000%
28	2676.03	-42804.22	-4809.65	-2676.05	42804.22	4809.70	0.000%
29	4626.61	-42804.22	-2830.26	-4626.64	42804.22	2830.29	0.000%
30	5385.95	-42804.22	23.73	-5386.00	42804.22	-23.73	0.000%
31	4641.86	-42804.22	2779.42	-4641.90	42804.22	-2779.44	0.000%
32	2663.32	-42804.22	4754.57	-2663.34	42804.22	-4754.61	0.000%
33	0.00	-42804.22	5470.70	0.00	42804.22	-5470.74	0.000%
34	-2663.32	-42804.22	4754.57	2663.34	42804.22	-4754.61	0.000%
35	-4641.86	-42804.22	2779.42	4641.90	42804.22	-2779.44	0.000%
36	-5385.95	-42804.22	23.73	5386.00	42804.22	-23.73	0.000%
37	-4626.61	-42804.22	-2830.26	4626.64	42804.22	2830.29	0.000%
38	-2676.03	-42804.22	-4809.65	2676.05	42804.22	4809.70	0.000%
39	0.00	-25365.25	-4386.32	0.00	25365.25	4386.32	0.000%
40	2088.85	-25365.25	-3829.78	-2088.85	25365.25	3829.78	0.000%
41	3607.79	-25365.25	-2275.89	-3607.79	25365.25	2275.89	0.000%
42	4218.80	-25365.25	28.78	-4218.80	25365.25	-28.78	0.000%
43	3626.29	-25365.25	2214.23	-3626.29	25365.25	-2214.23	0.000%
44	2073.43	-25365.25	3762.98	-2073.43	25365.25	-3762.98	0.000%
45	0.00	-25365.25	4321.58	0.00	25365.25	-4321.58	0.000%
46	-2073.43	-25365.25	3762.98	2073.43	25365.25	-3762.98	0.000%
47	-3626.29	-25365.25	2214.23	3626.29	25365.25	-2214.23	0.000%
48	-4218.80	-25365.25	28.78	4218.80	25365.25	-28.78	0.000%
49	-3607.79	-25365.25	-2275.89	3607.79	25365.25	2275.89	0.000%
50	-2088.85	-25365.25	-3829.78	2088.85	25365.25	3829.78	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00005180
3	Yes	4	0.00000001	0.00002924
4	Yes	5	0.00000001	0.00005754
5	Yes	5	0.00000001	0.00002661
6	Yes	5	0.00000001	0.00005469
7	Yes	5	0.00000001	0.00002529
8	Yes	4	0.00000001	0.00052584
9	Yes	4	0.00000001	0.00034353
10	Yes	5	0.00000001	0.00006211
11	Yes	5	0.00000001	0.00002905
12	Yes	5	0.00000001	0.00004956
13	Yes	4	0.00000001	0.00099391
14	Yes	4	0.00000001	0.00005095
15	Yes	4	0.00000001	0.00002894
16	Yes	5	0.00000001	0.00005067
17	Yes	5	0.00000001	0.00002340
18	Yes	5	0.00000001	0.00006137
19	Yes	5	0.00000001	0.00002867
20	Yes	4	0.00000001	0.00052597
21	Yes	4	0.00000001	0.00034358
22	Yes	5	0.00000001	0.00005442
23	Yes	5	0.00000001	0.00002516
24	Yes	5	0.00000001	0.00005899
25	Yes	5	0.00000001	0.00002732

26	Yes	4	0.00000001	0.00000853
27	Yes	4	0.00000001	0.00060302
28	Yes	4	0.00000001	0.00066346
29	Yes	4	0.00000001	0.00065241
30	Yes	4	0.00000001	0.00058665
31	Yes	4	0.00000001	0.00066970
32	Yes	4	0.00000001	0.00066443
33	Yes	4	0.00000001	0.00060837
34	Yes	4	0.00000001	0.00066685
35	Yes	4	0.00000001	0.00066871
36	Yes	4	0.00000001	0.00058840
37	Yes	4	0.00000001	0.00065428
38	Yes	4	0.00000001	0.00066838
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00002775
41	Yes	4	0.00000001	0.00002487
42	Yes	4	0.00000001	0.00002802
43	Yes	4	0.00000001	0.00004063
44	Yes	4	0.00000001	0.00002144
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00002170
47	Yes	4	0.00000001	0.00003893
48	Yes	4	0.00000001	0.00002805
49	Yes	4	0.00000001	0.00002534
50	Yes	4	0.00000001	0.00003037

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	150 - 97.25	14.042	39	0.7792	0.0082
L2	101.75 - 48.25	6.606	39	0.6323	0.0028
L3	54.25 - 1	1.798	39	0.3122	0.0008

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
149.00	20' Omni	39	13.878	0.7770	0.0081	92604
141.00	6' Dish w/ Shroud (HP)	39	12.569	0.7607	0.0071	51447
133.00	10' Omni	39	11.275	0.7429	0.0061	27236
122.00	RRUS-4449 B5/B12	39	9.543	0.7133	0.0048	16536

Maximum Tower Deflections - Design Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	150 - 97.25	62.320	2	3.4775	0.0359

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	101.75 - 48.25	29.250	2	2.8041	0.0123
L3	54.25 - 1	7.954	2	1.3815	0.0037

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	20' Omni	2	61.590	3.4681	0.0353	21003
141.00	6' Dish w/ Shroud (HP)	2	55.764	3.3913	0.0308	11668
133.00	10' Omni	2	50.004	3.3077	0.0265	6176
122.00	RRUS-4449 B5/B12	2	42.301	3.1709	0.0208	3748

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
2.5000	14	2.2500	105593.88 292291.37 0.36	109940.66 485203.68 0.23	19.259 45.000 0.43		Plate	0.43 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 97.25 (1)	TP31.76x20x0.25	52.75	0.00	0.0	24.2071	-8410.51	1416120.00	0.006
L2	97.25 - 48.25 (2)	TP42.19x30.2568x0.3125	53.50	0.00	0.0	40.2098	-16486.60	2352270.00	0.007
L3	48.25 - 1 (3)	TP52.1x40.2267x0.375	53.25	0.00	0.0	61.5657	-30427.40	3601590.00	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	150 - 97.25 (1)	TP31.76x20x0.25	311940.00	1051575.00	0.297	0.00	1051575.00	0.000
L2	97.25 - 48.25 (2)	TP42.19x30.2568x0.3125	960041.67	2274216.67	0.422	0.00	2274216.67	0.000
L3	48.25 - 1 (3)	TP52.1x40.2267x0.375	1886066.67	4344708.33	0.434	0.00	4344708.33	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 97.25 (1)	TP31.76x20x0.25	11839.70	424835.00	0.028	181.41	1135000.00	0.000
L2	97.25 - 48.25 (2)	TP42.19x30.2568x0.3125	15454.50	705682.00	0.022	259.31	2505325.00	0.000
L3	48.25 - 1 (3)	TP52.1x40.2267x0.375	19282.90	1080480.00	0.018	350.52	4894366.67	0.000

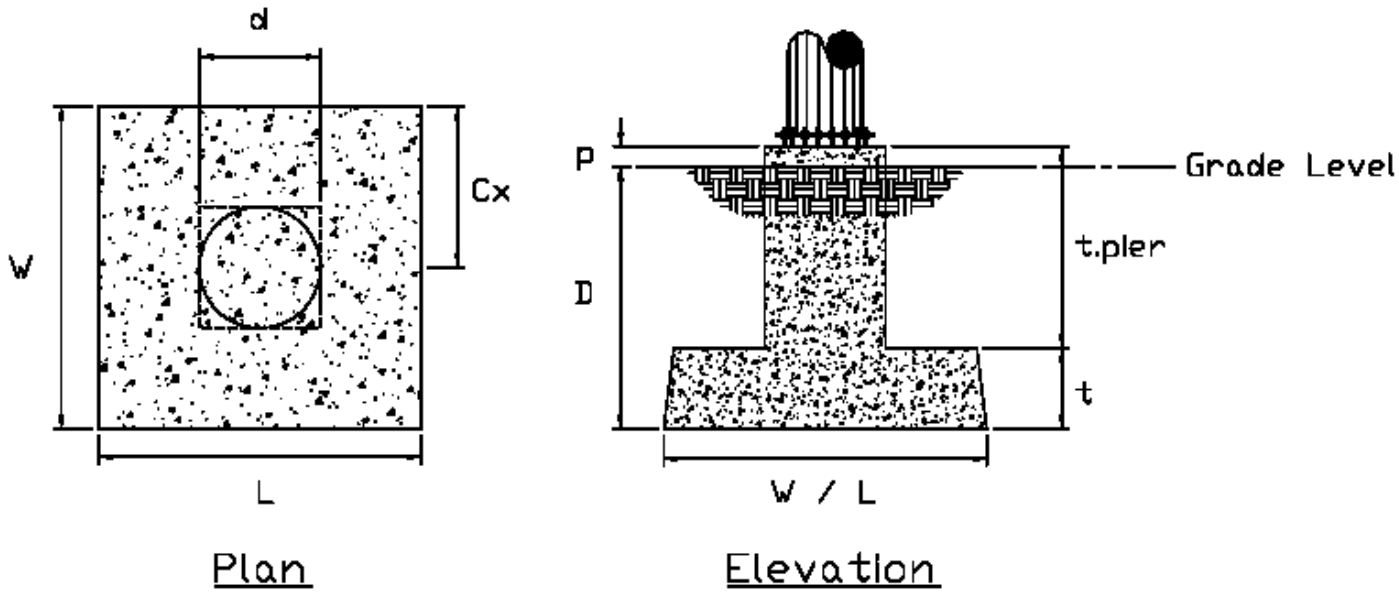
Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 97.25 (1)	0.006	0.297	0.000	0.028	0.000	0.303 ✔	1.000	4.8.2 ✔
L2	97.25 - 48.25 (2)	0.007	0.422	0.000	0.022	0.000	0.430 ✔	1.000	4.8.2 ✔
L3	48.25 - 1 (3)	0.008	0.434	0.000	0.018	0.000	0.443 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	150 - 97.25	Pole	TP31.76x20x0.25	1	-8410.51	1416120.00	30.3	Pass
L2	97.25 - 48.25	Pole	TP42.19x30.2568x0.3125	2	-16486.60	2352270.00	43.0	Pass
L3	48.25 - 1	Pole	TP52.1x40.2267x0.375	3	-30427.40	3601590.00	44.3	Pass
							Summary	
						Pole (L3)	44.3	Pass
						Base Plate	42.8	Pass
						RATING =	**44.3**	**Pass**

Monopole Foundation - Pad & Pier



Pad & Pier Dimensions

$W := 25.5\,ft$ — *Width of Pad*

$L := 25.5\,ft$ — *Length of Pad*

$d := 7\,ft$ — *Diameter of Pier*

$Cx := 12.75\,ft$ — *Minimum distance to center of gravity of tower from outer edge (based on foundation drawings)*

$p := 6\,in$ — *Projection of Pier above grade*

$D := 6.5\,ft$ — *Depth from grade to the bottom of foundation*

$t := 2\,ft$ — *Thickness of Pad*

$t_{pier} := D + p - t$ $\quad t_{pier} = 5\ ft$ — *Length of Pier*

$f'_c := 4 \cdot ksi$ — *Concrete compressive strength*

Pier Shape :=
- (•) "Circular"
- ( ) "Square"

Tower Reactions

$M_u := 1886067lbf \cdot ft$ — *Factored moment reaction*

$P_u := 30438lbf$ — *Factored download reaction*

$V_u := 19266lbf$ — *Factored shear reaction*

Soil Properties

$Bearing := 5.2ksf$ — *Ultimate bearing pressure*

Bearing_Type :=
- ○ "Gross"
- ◉ "Net"

$Bearing_{Ult} := Bearing$ $\quad Bearing_{Ult} = 5.2 \cdot ksf$ — *Ultimate bearing pressure*

$\phi_{soil} := 30deg$ — *Angle of internal friction*

$P_p := 100psf$ — *Passive pressure (conservatively assumed)*

$\mu := 0.25$ — *Coefficient of friction*

$H_{water} := 4ft$ — *Depth of water table*

$H_{frost} := 3ft$ — *Frost depth*

$\gamma_{conc} := 150pcf$

$\gamma_{soil} := 125pcf$

$\gamma_{H20} := 62.4pcf$

$\phi_b := 0.75$ — *Soil resistance factor for bearing per TIA-222-H Section 9.7*

$\phi_u := 0.75$ — *Soil resistance factor for uplift per TIA-222-H Section 9.7*

$\phi_o := 0.75$ — *Soil resistance factor for overturning per TIA-222-H Section 9.7*

$\phi_l := 0.75$ — *Soil resistance factor for lateral load per TIA-222-H Section 9.7*

Overturning Calculations

$A_{pad} := W \cdot L$ $\quad A_{pad} = 650.25\,ft^2$ *Area of pad*

$A_{pier} := \begin{cases} \pi \frac{d^2}{4} & \text{if Pier Shape = "Circular"} \\ d^2 & \text{if Pier Shape = "Square"} \end{cases}$ $\quad A_{pier} = 38.48\,ft^2$ *Area of pier*

$D_{tpad} := t_{pier} - p$ $\quad D_{tpad} = 4.5\,ft$

$y := \tan(30deg) \cdot D_{tpad}$ $\quad y = 2.6\,ft$

$Wt_{pad} := 0.9Wt_{pad.nominal}$ $\quad Wt_{pad} = 102.53 \cdot kip$ *Factored weight of the concrete pad per TIA-222-H Section 9.4 (bouyancy considered if applicable)*

$Wt_{pier} := 0.9Wt_{pier.nominal}$ $\quad Wt_{pier} = 24.9 \cdot kip$ *Factored weight of the concrete pier per TIA-222-H Section 9.4 (bouyancy considered if applicable)*

$V_{soil} := V_{soil.resist}$ $\quad V_{soil} = 3220.39 \cdot ft^3$ *Total volume of soil acting in overturning*

$Wt_{soil} := 0.9Wt_{soil.nominal}$ $\quad Wt_{soil} = 344.8 \cdot kip$ *Factored weight of soil per TIA-222-H Section 9.4 (bouyancy considered if applicable)*

$K_p := \frac{1 + \sin(\phi_{soil})}{1 - \sin(\phi_{soil})}$ $\quad K_p = 3$ *Rankine passive earth pressure coefficient*

$A := H_{water} - H_{frost}$ $\quad A = 1\,ft$ *Depth of soil layer between end of frost depth and start of water table*

$B := D - H_{water}$ $\quad B = 2.5\,ft$ *Depth of soil layer between start of water table and end of foundation*

$$M_{passive\ pressure} := \begin{cases} d \cdot \left[\gamma_{soil} \cdot K_p \cdot H_{frost} \cdot (D - H_{frost}) \left(\frac{D - H_{frost}}{2} \right) + 0.5 \gamma_{soil} \cdot K_p \cdot (D - H_{frost})^2 \left(\frac{D - H_{frost}}{3} \right) \right] & \text{if } H_{water} > D \\ d \cdot \left[\gamma_{soil} \cdot K_p \cdot H_{frost} \cdot A \left(B + \frac{A}{2} \right) + 0.5 \gamma_{soil} \cdot K_p \cdot (A)^2 \left(B + \frac{A}{3} \right) \ldots \right. & \text{if } H_{water} < D \\ \left. + \gamma_{soil} \cdot K_p \cdot H_{water} \cdot B \left(\frac{B}{2} \right) + 0.5 \gamma_{soil\_sub} \cdot K_p \cdot (B)^2 \left(\frac{B}{3} \right) \right] & \end{cases}$$

$M_{passive\ pressure} = 63.58 \cdot kip \cdot ft$

$M_v := V_u \cdot (D + p)$ $\quad M_v = 134.86 \cdot kip \cdot ft$ *Overturning moment due to shear*

$M_{resist} := \min(M_{passive\ pressure}, M_v + M_u)$ $\quad M_{resist} = 63.58 \cdot kip \cdot ft$

$M_u := M_u + M_v - M_{resist}$ $\quad M_u = 1957.35 \cdot kip \cdot ft$ *Total overturning moment reduced by passive resistance from soil*

Check overturning capacity

$$\phi M_n := \phi_o \cdot \left[\left(P_u + Wt_{pier} \right) \cdot Cx + \left(Wt_{pad} + Wt_{soil} \right) \cdot \frac{\min(W, L)}{2} \right] \qquad \phi M_n = 4807 \cdot kip \cdot ft$$

$$\frac{M_u}{\phi M_n} = 0.41$$

OverturningCheck = "Foundation is adequate to resist the overturning moment."

Soil Bearing Calculations

$A_{pad} := W \cdot L$ $\quad A_{pad} = 650.25\ ft^2$ *Area of pad*

$A_{pier} :=$ $\pi \frac{d^2}{4}$ if Pier Shape = "Circular"; d^2 if Pier Shape = "Square" $\quad A_{pier} = 38.48\ ft^2$ *Area of pier*

$S := \frac{A_{pad} \cdot \min(W, L)}{6}$ $\quad S = 2763.56 \cdot ft^3$ *Section modulus of pad base*

$D_{tpad} := t_{pier} - p$ $\quad D_{tpad} = 4.5\ ft$ *Depth of soil to top of pad*

$V_{soil} := D_{tpad} \cdot W \cdot L - D_{tpad} \cdot A_{pier}$ $\quad V_{soil} = 2752.94 \cdot ft^3$ *Volume of soil above concrete pad*

$Wt_{soil} := V_{soil} \cdot \gamma_{soil}$ $\quad Wt_{soil} = 344.12 \cdot kip$ *Weight of soil above concrete pad*

$Wt_{pad} = 32.51 \cdot kip$ *Weight of concrete pad (Bouyancy conservatively not conssidered)*

$Wt_{pier} = 7.22 \cdot kip$ *Weight of concrete pier (Bouyancy conservatively not conssidered)*

$Wt_{soils} = 0 \cdot kip$ *Weight of soil is ignored if Net Bearing Pressure is given*

$Wt_{total} := 1.2Wt_{pad} + 1.2Wt_{pier} + 1.2Wt_{soils}$ $\quad Wt_{total} = 47.67 \cdot kip$ *Total factored weight of concrete foundation and soil above pad*

Check soil bearing capacity

$\phi R_s := \phi_b \cdot Bearing_{Ult}$ $\quad \phi R_s = 3.9 \cdot ksf$ *Soil bearing strength*

$$R_u := \frac{\left(P_u + Wt_{total} \right)}{A_{pad}} + \frac{M_u + \left[P_u \cdot \left(\frac{\min(L, W)}{2} - Cx \right) \right]}{S} \qquad R_u = 0.83 \cdot ksf$$ *Factored design bearing load*

$$\frac{R_u}{\phi R_s} = 0.21$$

BearingCheck = "Soil bearing strength is adequate."

Lateral Calculations

$Wt_{total} := 0.9Wt_{pad.nominal} + 0.9Wt_{pier.nominal} + 0.9Wt_{soil.nominal} = 419.96 \cdot kip$

Total factored weight of foundation per TIA-222-H Section 9.4 (bouyancy considered if applicable)

$$P_{resist} := \begin{cases} P_p \cdot \min(L, W) \cdot (t) & \text{if } D_{tpad} \geq H_{frost} \\ \left[P_p \cdot \min(L, W) \cdot \left(D - H_{frost}\right)\right] & \text{otherwise} \end{cases}$$

$P_{resist} = 5.1 \cdot kip$

Lateral load resistance provided by soil passive pressure

$f := \mu \cdot \left(P_u + Wt_{total}\right)$ $\quad f = 112.6 \cdot kip$

Lateral load resistance provided by friction force

Check lateral capacity

$\phi R_s := \phi_l \cdot \left(f + P_{resist}\right)$ $\quad \phi R_s = 88.27 \cdot kip$

Lateral strength

$R_u := V_u$ $\quad R_u = 19.27 \cdot kip$

Factored design lateral force

$$\frac{R_u}{\phi R_s} = 0.22$$

LateralCheck = "Foundation is adequate to support lateral load."

Concrete Pad and Pier Bearing Strength Calculations

ACI 318-14 Sections 22.8

$Wt_{pier} := t_{pier} \cdot A_{pier} \cdot \gamma_{conc}$ $\quad Wt_{pier} = 28.86 \cdot kip$

Weight of concrete pier (Bouyancy conservatively not considered)

$A_1 := A_{pier}$ $\quad A_1 = 38.48\ ft^2$

Loaded Area

$A_2 := \min\left[\frac{(d + 4t)^2}{4} \cdot \pi, \frac{\min(L, W)^2}{4} \cdot \pi\right]$ $\quad A_2 = 176.71\ ft^2$

Area of lower base per ACI 318-14 Section 22.8.3.2

$B_n := \min\left[\sqrt{\frac{A_2}{A_1}} \cdot \left(0.85 \cdot f'_c \cdot A_{pier}\right), 2 \cdot \left(0.85 \cdot f'_c \cdot A_1\right)\right]$ $\quad B_n = 3.77 \times 10^4 \cdot kips$

Nominal bearing strength based on the fact that the supporting surface is wider than the loaded area

$\phi_b := 0.65$

Bearing strength reduction factor

$\phi B_n := \phi_b \cdot B_n$ $\quad \phi B_n = 2.45 \times 10^4 \cdot kip$

Design bearing strength

$B_u := P_u + 1.2 \cdot Wt_{pier}$ $\quad B_u = 65.07 \cdot kip$

Factored design compressive force

$$\frac{B_u}{\phi B_n} = 0.0027$$

Bearing Strength Check = "Concrete pier/pad bearing strength is adequate."

Concrete Pad and Pier Two-Way Shear Strength Calculations

ACI 318-14 Sections 8.4.4 and 22.6

$t_1 := t - 3.5in$ $\quad t_1 = 1.71\ ft$ — *Distance from extreme compression fiber to centroid of tension reinforcement*

$b_o := \begin{cases} \pi(d + t) & \text{if Pier Shape = "Circular"} \\ 4(d + t) & \text{if Pier Shape = "Square"} \end{cases}$ $\quad b_o = 28.27\ ft$ — *Perimeter at critical section*

$A_{crit\_shear} := b_o \cdot t$ $\quad A_{crit\_shear} = 56.55\ ft^2$ — *Area of critical section*

$\lambda := 1$ — *Concrete modification factor*

$\beta := 1$ — *Length to width ratio of the pier*

$\alpha_s := 40$ — *Constant for "interior" columns*

$v_{c\_a} := 4 \cdot \lambda \cdot \sqrt{\frac{f'_c}{psi}}\ psi$ $\quad v_{c\_a} = 252.98 \cdot psi$ — *Nominal two-way shear strength provided by concrete*

$v_{c\_b} := \left(2 + \frac{4}{\beta}\right) \lambda \cdot \sqrt{\frac{f'_c}{psi}}\ psi$ $\quad v_{c\_b} = 379.47\ psi$ — *Nominal two-way shear strength provided by concrete*

$v_{c\_c} := \left(2 + \frac{\alpha_s \cdot t}{b_o}\right) \lambda \cdot \sqrt{\frac{f'_c}{psi}}\ psi$ $\quad v_{c\_c} = 305.44\ psi$ — *Nominal two-way shear strength provided by concrete*

$\phi_s := 0.75$ — *Shear strength reduction factor*

$\phi V_n := \phi_s \cdot \min(v_{c\_a}, v_{c\_b}, v_{c\_c})$ $\quad \phi V_n = 189.74 \cdot psi$ — *Two-way shear strength provided by concrete*

$V_u := \frac{P_u + 1.2Wt_{pier}}{A_{crit\_shear}}$ $\quad V_u = 7.99\ psi$ — *Factored design two-way shear stress*

$$\frac{V_u}{\phi V_n} = 0.04$$

Two-Way Shear Strength Check = "Two-way shear strength provided by the concrete foundation pad is adequate."

PROJECT:	LTE 5G NR CBAND + DoD + LTE 5C ADD + 5G NR 1DR-1
SITE NUMBER:	CTL02638
USID:	163489
FA NUMBER:	10152336
PTN NUMBER:	2051A11PJ8, 2051A11LWG, 2051A11LTR, 2051A11LW8, 2051A11LTS
PACE NUMBER:	MRCTB054248, MRCTB055469, MRCTB056066, MRCTB055837, MRCTB056148
SITE NAME:	STRATFORD ORONOQUE ROAD
SITE ADDRESS:	200 ORONOQUE LANE STRATFORD, CT 06614

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

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

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

PROJECT INFORMATION

SITE NAME:	STRATFORD ORONOQUE ROAD
SITE NUMBER:	CTL02638
SITE ADDRESS:	200 ORONOQUE LANE STRATFORD, CT 06614
FA NUMBER:	10152336
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PACE NUMBER:	MRCTB054248, MRCTB055469, MRCTB056066, MRCTB055837, MRCTB056148
USID NUMBER:	163489
APPLICANT:	AT&T WIRELESS 550 COCHITUATE ROAD SUITE 550 13 AND 14 FRAMINGHAM, MA 01701
OWNER:	TOWN OF STRATFORD 200 ORONOQUE LANE STRATFORD, CT 06614
JURISDICTION:/ ZONING:	– / –
COUNTY:	: FAIRFIELD
SITE COORDINATES FROM	(RFDS)
LATITUDE:	41.251411°/41°15'05.1"
LONGITUDE:	–73.117151° /–73°07'01.7"
GROUND ELEV.:	264'
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
AT&T RF MANAGER:	PRASHANTH SIMHA
PHONE:	(201)628–5071
EMAIL:	pn5165@att.com

PROJECT CONSULTANTS

PROJECT MANAGER:	SMARTLINK
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EMAIL:	Sharon.Keefe@smartlinkllc.com
SITE AQUISITION:	SMARTLINK
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EMAIL:	Kristina.Cottone@smartlinkllc.com
ENGINEER/ARCHITECT:	FULLERTON ENGINEERING, P.C.
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EMAIL:	kristina.cottone@smartlinkgroup.com

SCOPE OF WORK

SCOPE HEREIN BASED ON RFDS ID # 4846452, VERSION 2.00 LAST UPDATED 05/23/2022.

EXISTING TOWER EQUIPMENT TO BE REMOVED:
(9) HPA–65R–BUU–H8 ANTENNAS
(3) RRUS–11 B5
(3) RRUS–12 B2+ RRUS–A2 B25

EXISTING TOWER EQUIPMENT TO REMAIN:
(3) KATHREIN 800–10966 ANTENNAS
(3) RRUS–32 B30
(3) RRUS–4449 B5/B2
(2) WCS–IMFQ–AMT FILTERS
(4) DC6–48–60–18 RAYCAPS
(2) FIBER AND (8) DC POWER CABLES

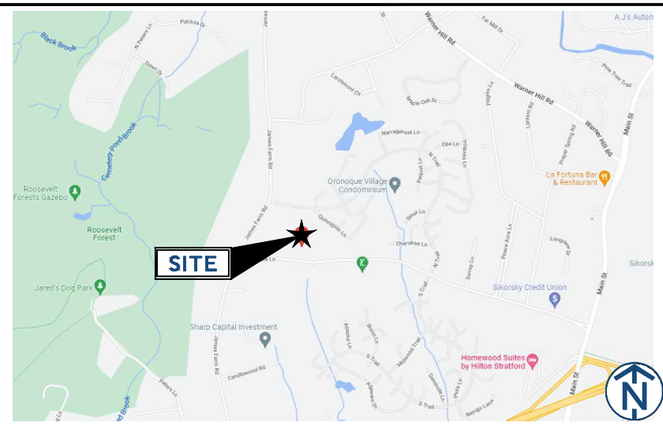
NEW TOWER EQUIPMENT TO BE INSTALLED:
(3) TPA65R–BU8DA–K ANTENNAS
(3) AIR6449 B77D STACKED ANTENNAS
(3) AIR6419 B77G STACKED ANTENNAS
(3) RRUS–4478 B14
(3) RRUS–8843 B2/B66A
(6) Y–CABLES
(1) 18–PAIR FIBER CABLE

GROUND EQUIPMENT TO BE REMOVED:
DECOMMISSION EXISTING UMTS

GROUND EQUIPMENT TO BE INSTALLED:
(1) NEW RBS 6648 BBU AND XCEDE 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



NO SCALE

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
A5A	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	04/27/22	90% REVIEW	MS
1	05/26/22	REVISED 90%	SM
2	6/2/22	FINAL	KR

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
STRATFORD ORONOQUE ROAD

SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
TITLE SHEET

SHEET NUMBER
T1

PROJECT# 2021.0215.0011

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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0	04/27/22	90% REVIEW	MS
1	05/26/22	REVISED 90%	SM
2	6/2/22	FINAL	KR

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.

STATE OF CONNECTICUT
BARBARA T. KOTECKI
33711
LICENSED PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME
STRATFORD
ORONOQUE ROAD

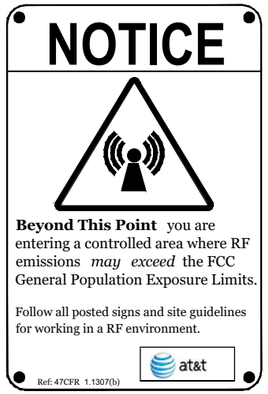
SITE NUMBER:
CTL02638

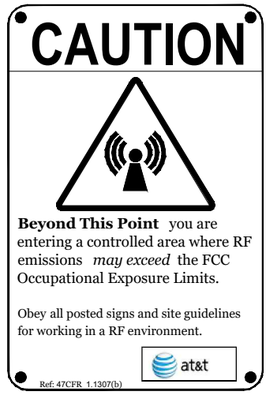
SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP1

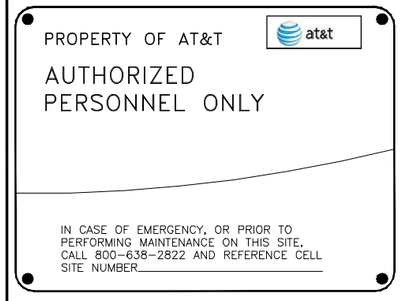
PROJECT# 2021.0215.0011





ALERTING SIGNS

ALERTING SIGN



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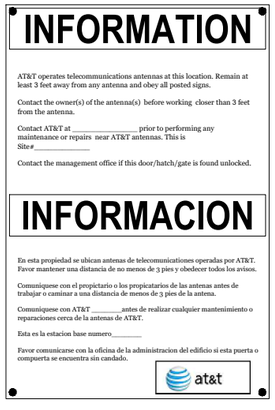
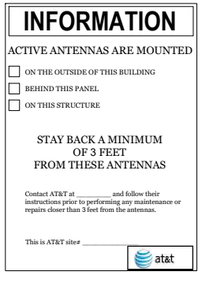


INFO SIGN #1



INFO SIGN #2

INFO SIGN #3

ALERTING SIGN
(FOR CELL SITE BATTERIES)

ALERTING SIGN
(FOR DIESEL FUEL)

ALERTING SIGN
(FOR PROPANE)

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							
RADIATION AREA IS WITHIN 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X		EITHER NOTICE OR CAUTION SIGN (BASED ON ROOFVIEW RESULTS) AT ANTENNA /BARRIER	
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

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

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

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

REV	DATE	DESCRIPTION	BY
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1	05/26/22	REVISED 90%	SM
2	6/2/22	FINAL	KR

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SITE NAME
STRATFORD
ORONOQUE ROAD

SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP2

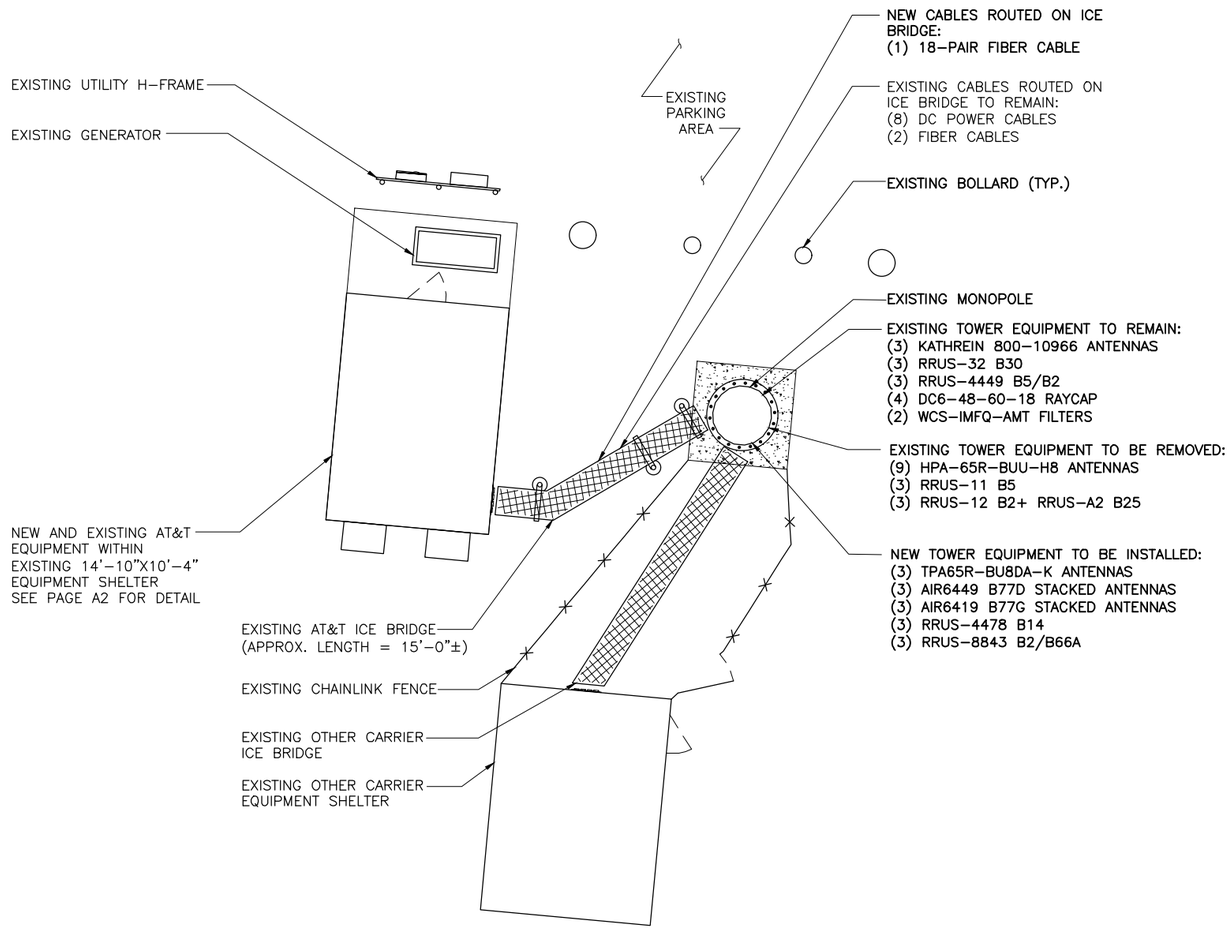
PROJECT# 2021.0215.0011

ABBREVIATIONS

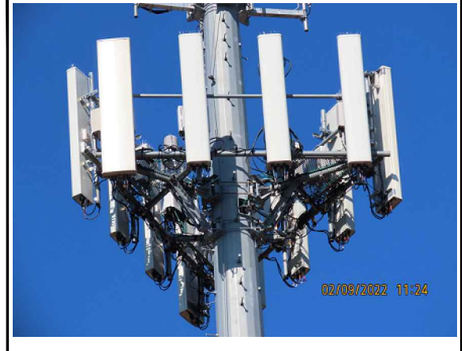
AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
℄	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT(FEET)
EGB	EQUIPMENT GROUND BAR
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 (A, S-1)



COMPOUND PLAN — SCALE: 3/32" = 1'-0" (0 2' 4' 8' 16') — 1



SITE PHOTO 1 — SCALE: N.T.S. — 2

SITE PHOTO 2 — SCALE: N.T.S. — 3

at&t
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smartlink
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FULLERTON
1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
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STATE OF CONNECTICUT · BARBARA T. KOTECKI · 33711 · LICENSED PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME
STRATFORD
ORONOQUE ROAD

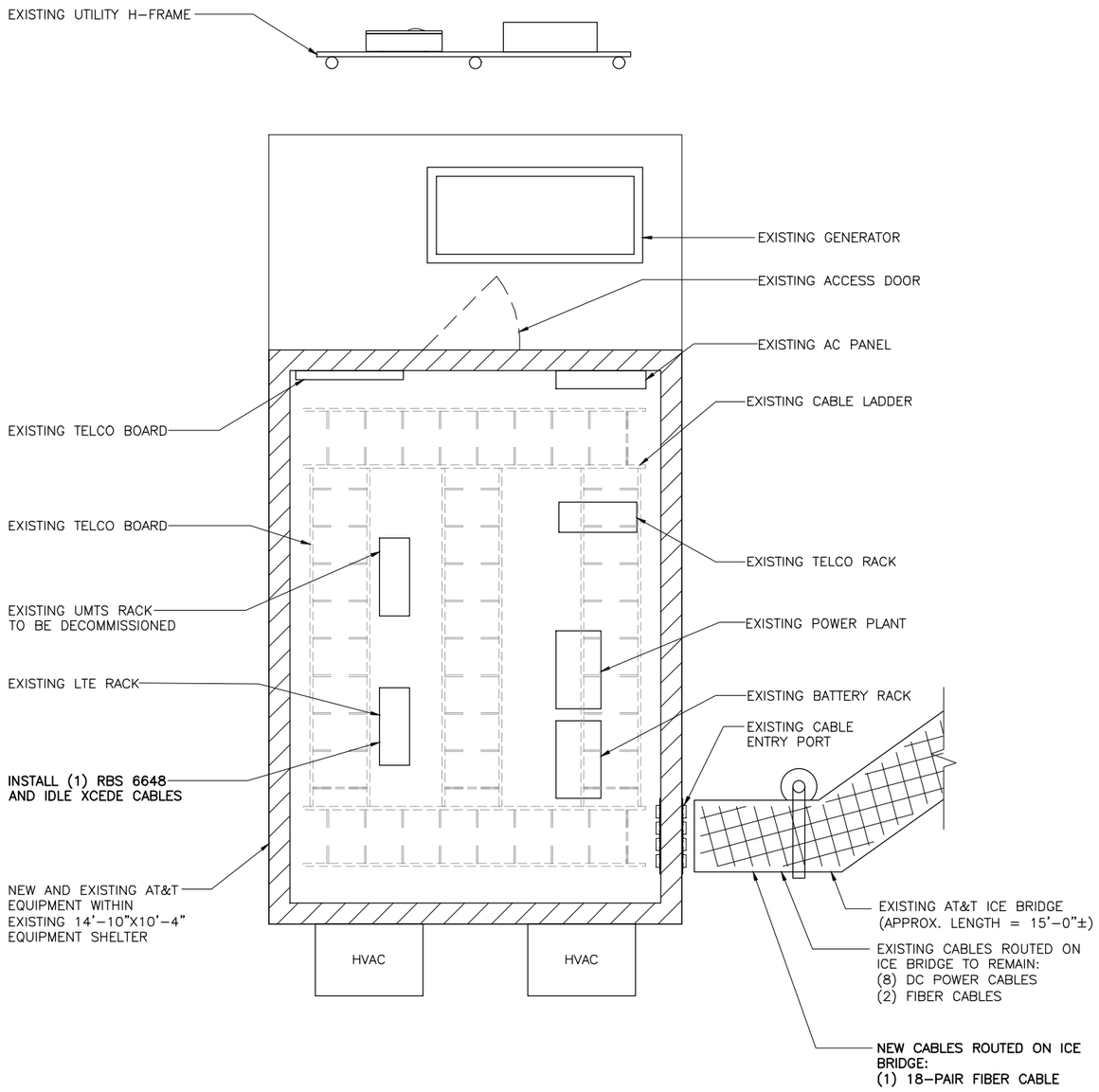
SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
COMPOUND PLAN

SHEET NUMBER
A1

PROJECT# 2021.0215.0011



EQUIPMENT PLAN

0 1' 2' 4' 6'

SCALE: 1/4" = 1'–0"

1

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SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

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STATE OF CONNECTICUT
BARBARA T. KOTECKI
33711
PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME

STRATFORD
ORONOQUE ROAD

SITE NUMBER:

CTL02638

SITE ADDRESS

200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME

EQUIPMENT
PLAN

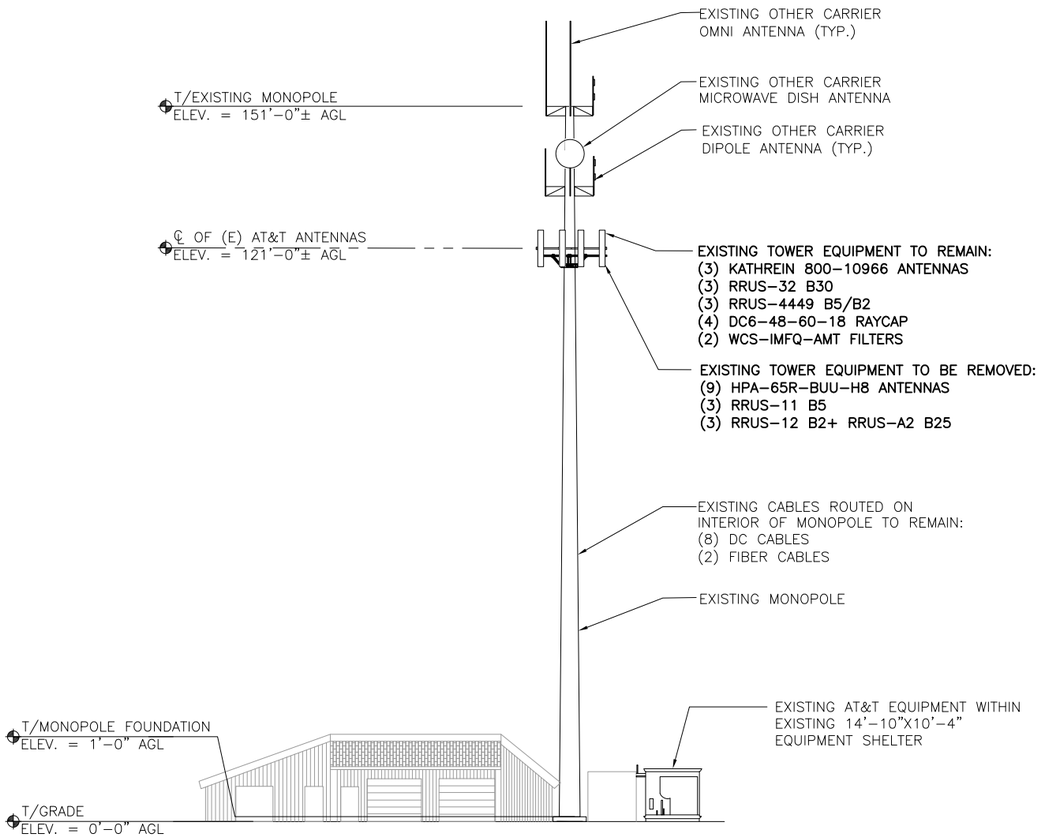
SHEET NUMBER

A2

PROJECT# 2021.0215.0011

NOTES:

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



EXISTING ELEVATION

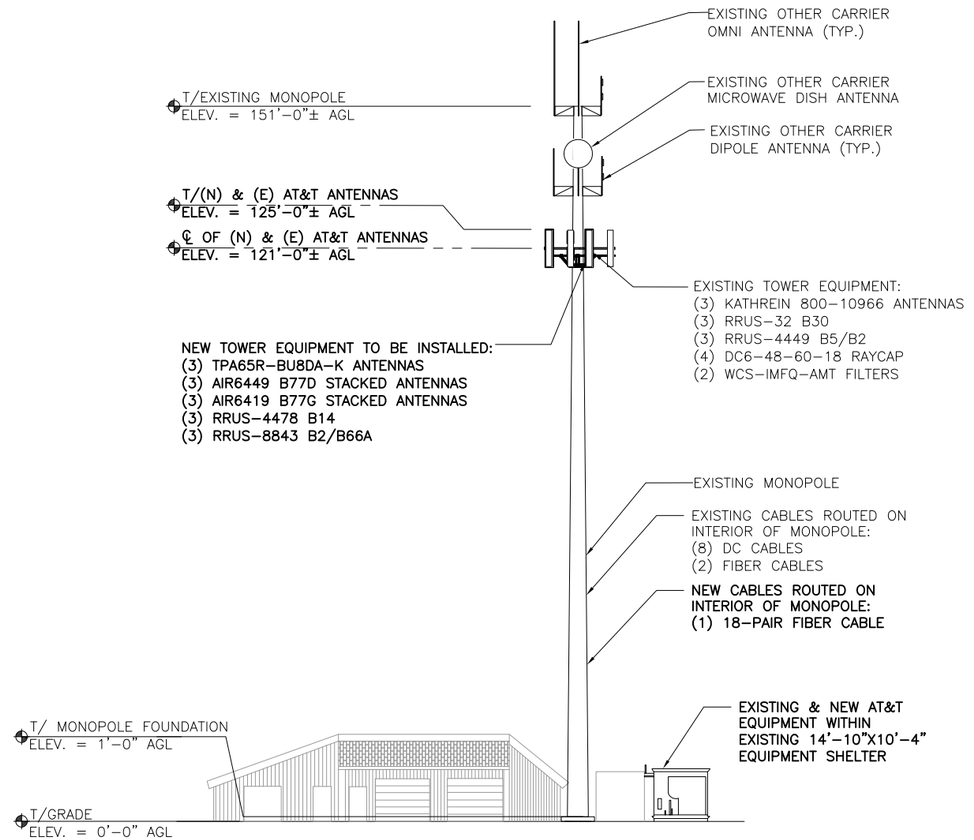
0 8' 16' 32' 48'

SCALE: 1/32" = 1'-0"

1

NOTES:

1. 3 FEET MINIMUM SEPARATION BETWEEN LTE ANTENNAS
2. 6 FEET MINIMUM SEPARATION BETWEEN 700DE & 700BC
3. 4 FEET MINIMUM INTERSECTOR SEPARATION BETWEEN ANTENNAS EDGE TO EDGE



NEW ELEVATION

0 8' 16' 32' 48'

SCALE: 1/32" = 1'-0"

2

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SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

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STATE OF CONNECTICUT
BARBARA T. KOTECKI
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PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME

STRATFORD
ORONOQUE ROAD

SITE NUMBER:

CTL02638

SITE ADDRESS

200 ORONOQUE LANE
STRATFORD, CT 06614

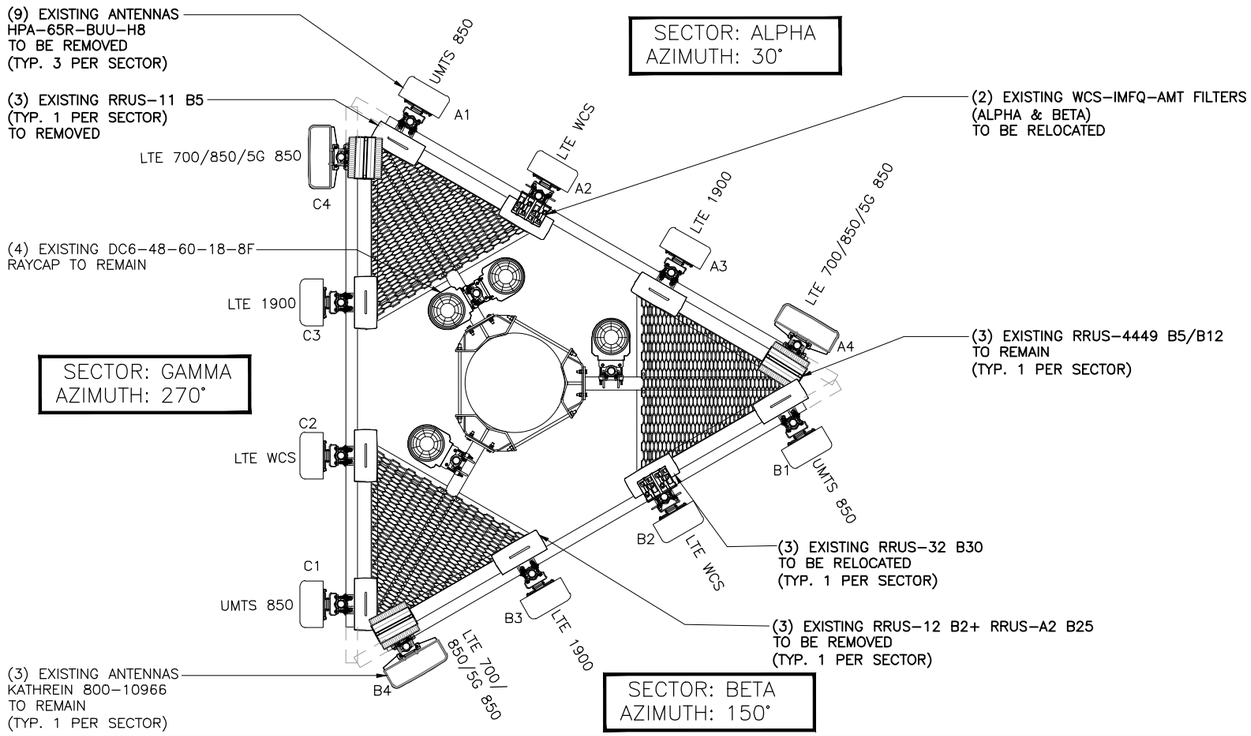
SHEET NAME

ELEVATIONS

SHEET NUMBER

A3

PROJECT# 2021.0215.0011

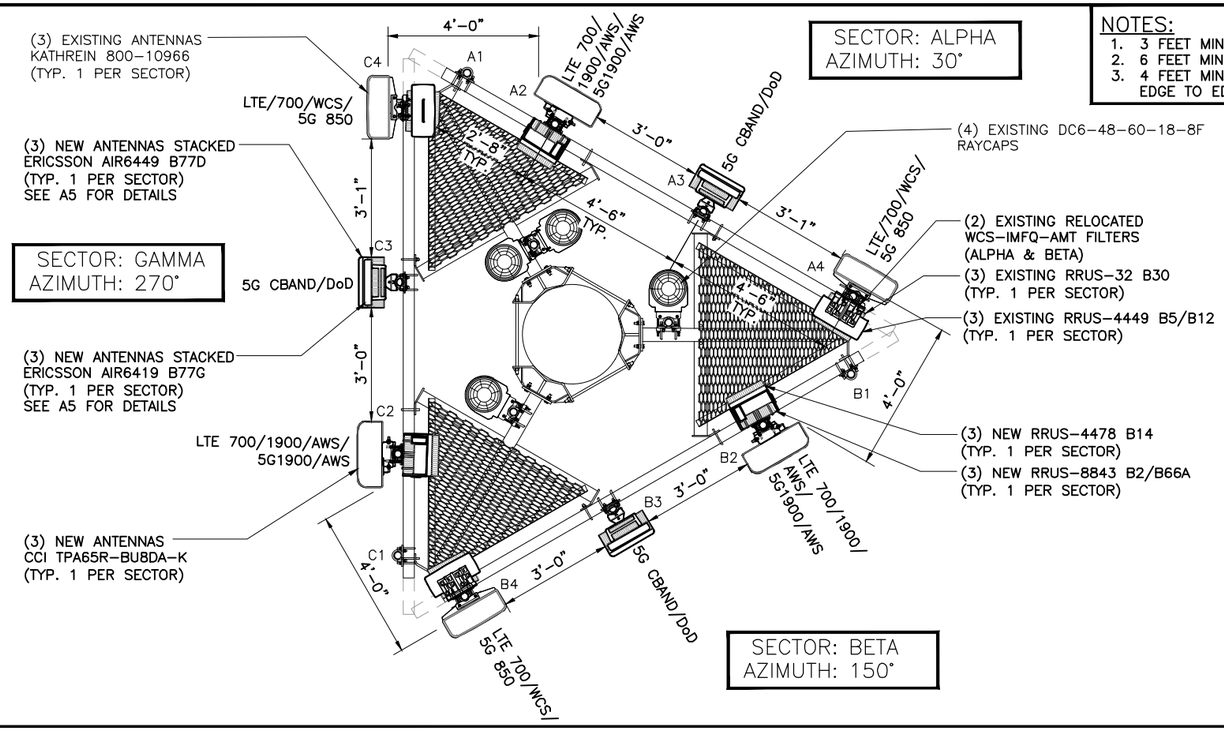


EXISTING ANTENNA PLAN

0 1' 2' 4' 6'

SCALE: 1/4" = 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
3. 4 FEET MINIMUM INTERSECTOR SEPARATION BETWEEN ANTENNAS EDGE TO EDGE

FINAL ANTENNA PLAN

0 1' 2' 4' 6'

SCALE: 1/4" = 1'-0" | 2

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ORONOQUE ROAD

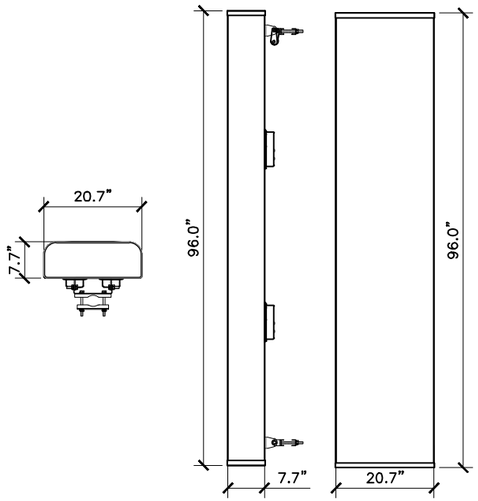
SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
ANTENNA
PLANS

SHEET NUMBER
A4

PROJECT# 2021.0215.0011



PLAN VIEW SIDE VIEW FRONT VIEW

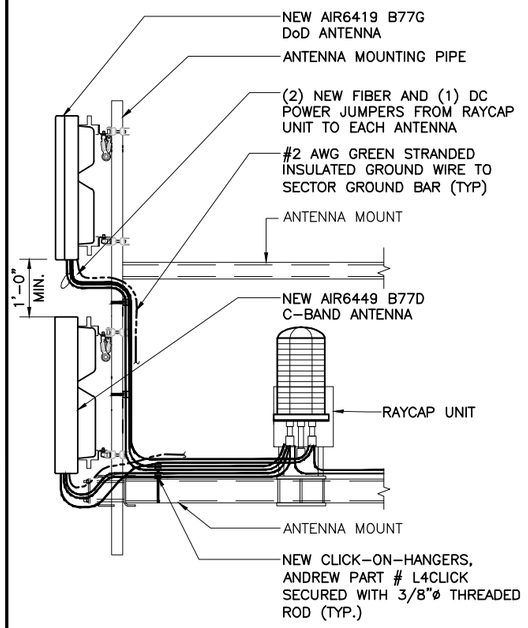
CCI – TPA65R–BU8DA–K

MULTI–BAND TWELVE PORT ANTENNA

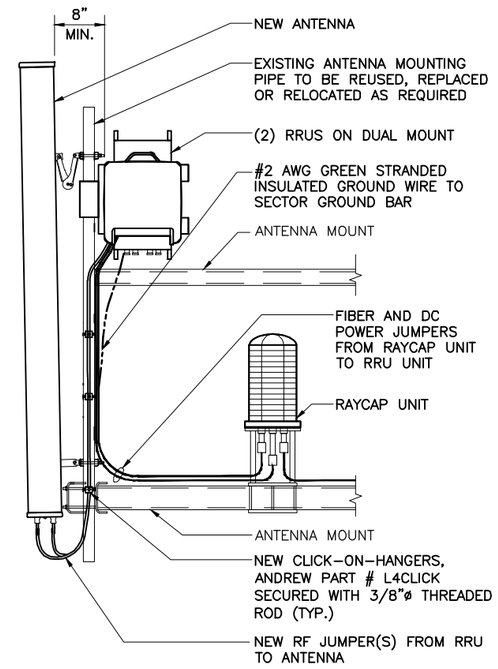
FREQUENCY RANGE	4 LOW x 698–896 MHz 8 HIGH x 1695–2400 MHz
ANTENNA	87.1 Lbs

ANTENNA SPEC SCALE: N.T.S. 1

NOT USED SCALE: N.T.S. 2



ANTENNA SCHEMATIC SCALE: N.T.S. 3



ANTENNA SCHEMATIC SCALE: N.T.S. 4

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STATE OF CONNECTICUT
BARBARA T. KOTECKI
33711
PROFESSIONAL ENGINEER
LICENSED

Jun 3 2022

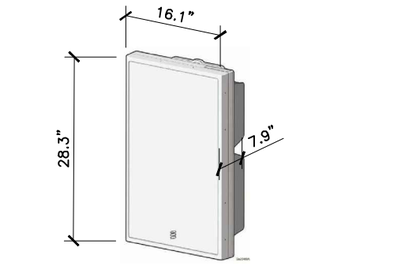
SITE NAME
STRATFORD
ORONOQUE ROAD

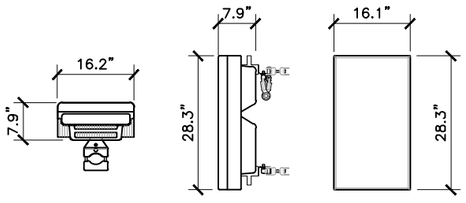
SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5





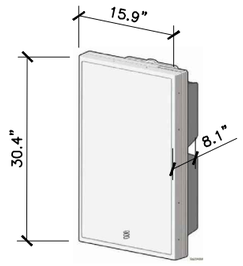
PLAN VIEW SIDE VIEW FRONT VIEW

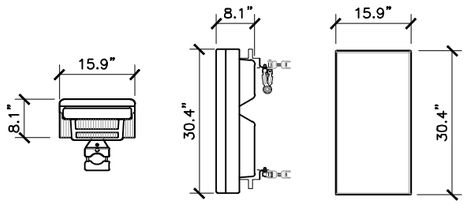
ERICSSON – AIR6419 B77G

MASSIVE MIMO MID–BAND

WEIGHT W/ HARDWARE 77 Lbs

ANTENNA SPEC SCALE: N.T.S. 5





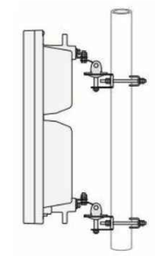
PLAN VIEW SIDE VIEW FRONT VIEW

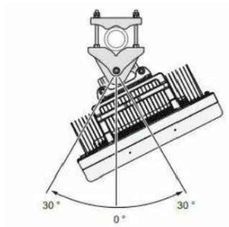
ERICSSON – AIR6449 B77D

MASSIVE MIMO MID–BAND

WEIGHT W/ HARDWARE 81.6 Lbs

ANTENNA SPEC SCALE: N.T.S. 6



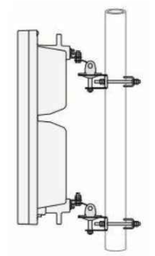


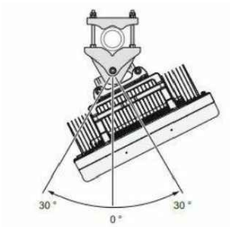
Pole	Circular	Square	90° Angle
Minimum outer dimension	Ø76 mm	50 × 50 mm	50 × 50 mm
Maximum outer dimension	Ø114 mm	80 × 80 mm	80 × 80 mm

ERICSSON – AIR 6419 B77G MOUNT

BRACKET SUPPORTING AIR WITH TILTING +/–20 DEGREE AND RIGHT/LEFT 30 DEGREE

ANTENNA SPEC SCALE: N.T.S. 7





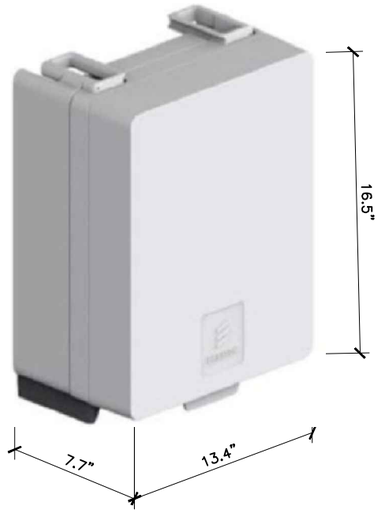
Pole	Circular	Square	90° Angle
Minimum outer dimension	Ø76 mm	50 × 50 mm	50 × 50 mm
Maximum outer dimension	Ø114 mm	80 × 80 mm	80 × 80 mm

ERICSSON – AIR 6449 B77D MOUNT

BRACKET SUPPORTING AIR WITH TILTING +/–20 DEGREE AND RIGHT/LEFT 30 DEGREE

ANTENNA SPEC SCALE: N.T.S. 8

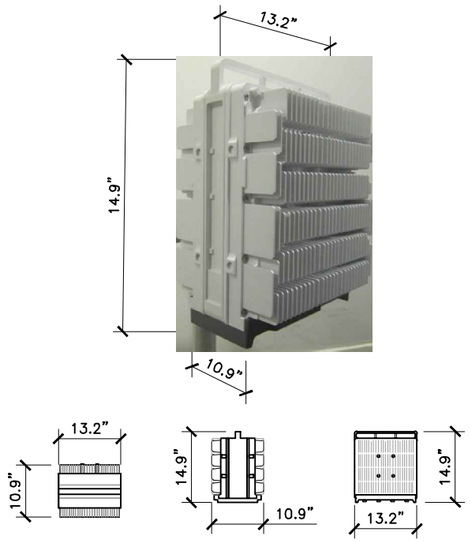
PROJECT# 2021.0215.0011



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. 1



PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON –RRUS 8843 B2, B66A

FREQUENCY RANGE	B2 TX	1930–1990 MHz
	B66A TX	2110–2180 MHz
	B2 RX	1850–1910 MHz
	B66A RX	1710–1780 MHz
TOTAL WEIGHT		72 Lbs

RRU SPEC SCALE: N.T.S. 2

NOT USED SCALE: N.T.S. 3

NOT USED SCALE: N.T.S. 4

NOT USED SCALE: N.T.S. 5

NOT USED SCALE: N.T.S. 6

NOT USED SCALE: N.T.S. 7

NOT USED SCALE: N.T.S. 8

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STATE OF CONNECTICUT
BARBARA T. KOTECKI
33711
LICENSED PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME
STRATFORD
ORONOQUE ROAD

SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5A

PROJECT# 2021.0215.0011

FINAL ANTENNA CONFIGURATION AND CABLE SCHEDULE
SUPPLIED BY AT&T WIRELESS, FROM RF CONFIG. DATED (05/23/22, V2)

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	–	–	–	–	–	–	–	–	(2) (E) DC6-48-60-18-8F UNIT
								–	–	
	A-2	(N) LTE 700/1900	TPA65R-BU8DA-K	CCI	(1) NEW RRUS-4478 B14 (1) NEW RRUS-8843 B2 B66A (1) NEW Y-CABLE	30°	121'-0"	SEE ANTENNA A-3 FOR CABLE SIZE AND LENGTH		
	A-3	(N) 5G CBAND /DoD	AIR6449 B77D + AIR6419 B77G STACKED	ERICSSON	–	30°	121'-0"	(1) EXISTING FIBER CABLE	160'-0"	
								(4) EXISTING DC CABLES	160'-0"	
	A-4	(E) LTE 700/WCS/ 5G 850	800-10966	KATHREIN	(1) EXISTING 4449 B5/B12 (1) EXISTING RRUS-32 B30 (1) EXISTING WCS FILTER (1) NEW Y-CABLE	30°	121'-0"	SEE ANTENNA A-3 FOR CABLE SIZE AND LENGTH		
BETA	B-1	–	–	–	–	–	–	–	–	(1) (E) DC6-48-60-18-8F UNIT
								–	–	
	B-2	(N) LTE 700/1900	TPA65R-BU8DA-K	CCI	(1) NEW RRUS-4478 B14 (1) NEW RRUS-8843 B2 B66A (1) NEW Y-CABLE	150°	121'-0"	SEE ANTENNA B-3 FOR CABLE SIZE AND LENGTH		
	B-3	(N) 5G CBAND /DoD	AIR6449 B77D + AIR6419 B77G STACKED	ERICSSON	–	150°	121'-0"	(1) NEW 18-PAIR FIBER CABLE	160'-0"	
								(2) EXISTING DC CABLES	160'-0"	
	B-4	(E) LTE 700/WCS/ 5G 850	800-10966	KATHREIN	(1) EXISTING 4449 B5/B12 (1) EXISTING RRUS-32 B30 (1) EXISTING WCS FILTER (1) NEW Y-CABLE	150°	121'-0"	SEE ANTENNA B-3 FOR CABLE SIZE AND LENGTH		
GAMMA	C-1	–	–	–	–	–	–	–	–	(1) (E) DC6-48-60-18-8F UNIT
								–	–	
	C-2	(N) LTE 700/1900	TPA65R-BU8DA-K	CCI	(1) NEW RRUS-4478 B14 (1) NEW RRUS-8843 B2 B66A (1) NEW Y-CABLE	270°	121'-0"	SEE ANTENNA C-3 FOR CABLE SIZE AND LENGTH		
	C-3	(N) 5G CBAND /DoD	AIR6449 B77D + AIR6419 B77G STACKED	ERICSSON	–	270°	121'-0"	(1) EXISTING FIBER CABLE	160'-0"	
								(2) EXISTING DC CABLES	160'-0"	
	C-4	(E) LTE 700/WCS/ 5G 850	800-10966	KATHREIN	(1) EXISTING RRUS-4449 B5/B12 (1) EXISTING RRUS-32 B30 (1) NEW Y-CABLE	270°	121'-0"	SEE ANTENNA C-3 FOR CABLE SIZE AND LENGTH		

–

ANTENNA & CABLE CONFIGURATION

SCALE: N.T.S. | 1

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STATE OF CONNECTICUT · BARBARA T. KOTECKI · 33711 · LICENSED PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME
STRATFORD
ORONOQUE ROAD

SITE NUMBER:
CTL02638

SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A6

PROJECT# 2021.0215.0011

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.

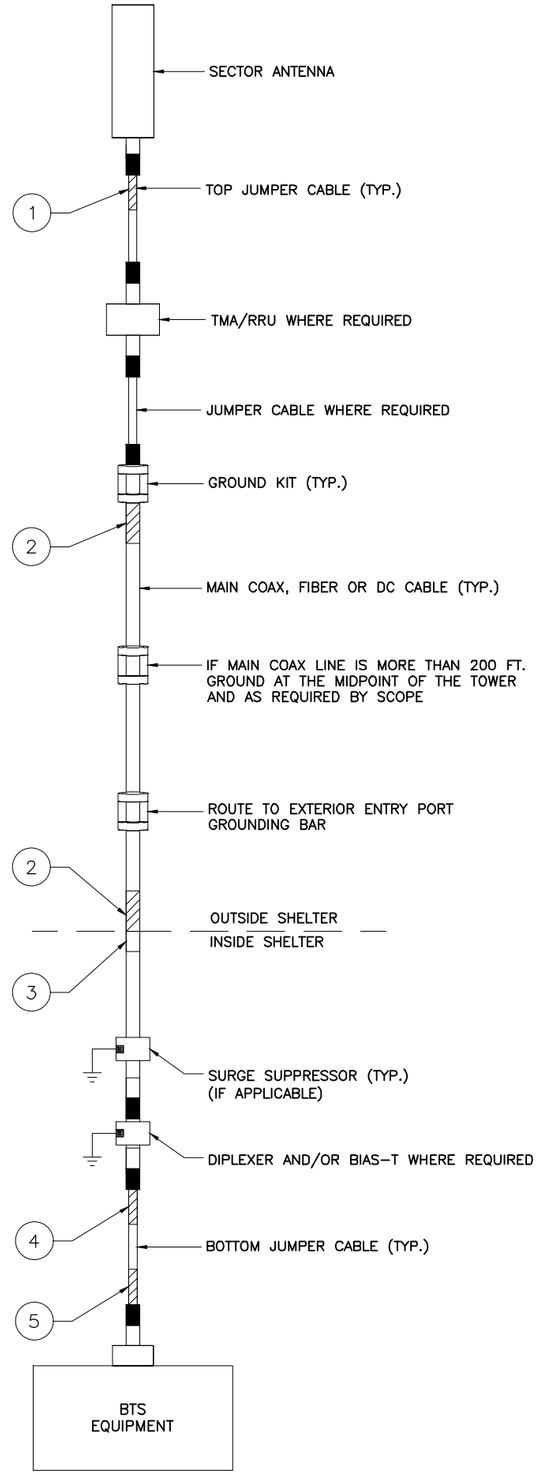
CABLE MARKING DIAGRAM

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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Jun 3 2022

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SITE NUMBER:
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SITE ADDRESS
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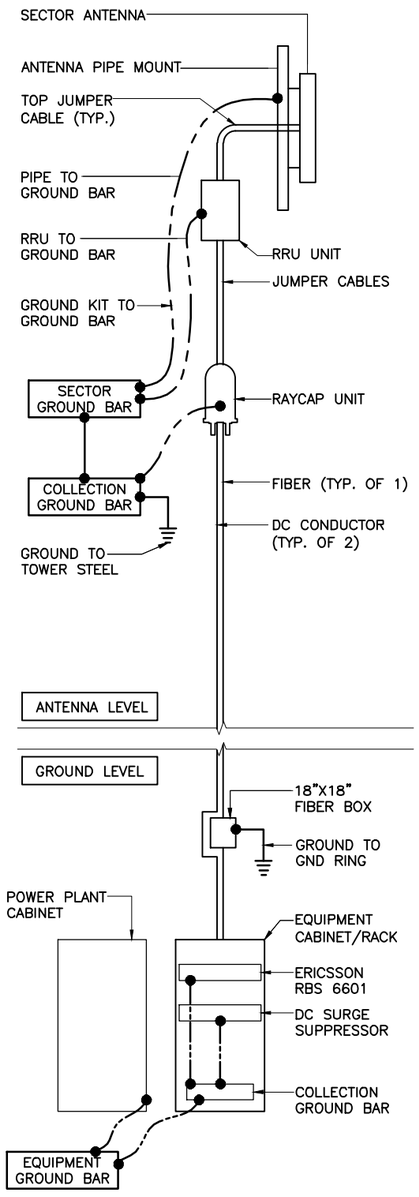
STRATFORD, CT 06614

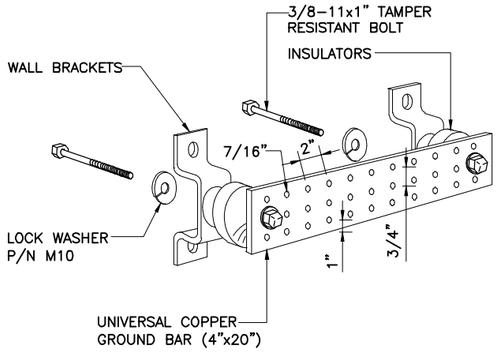
SHEET NAME
CABLE NOTES AND COLOR CODING

SHEET NUMBER
A7

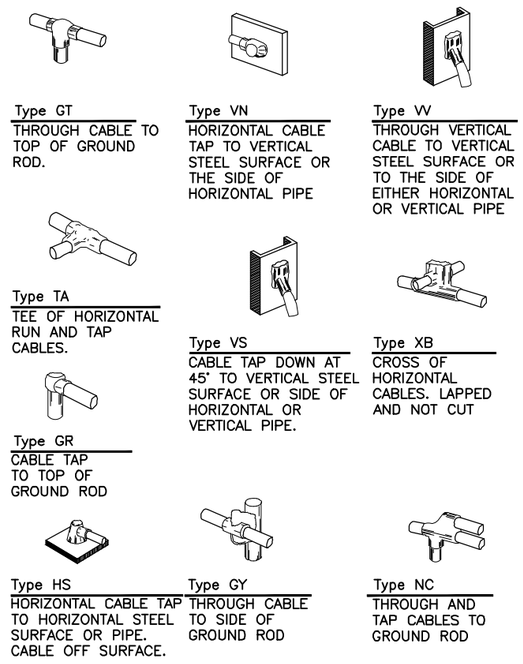
PROJECT# 2021.0215.0011



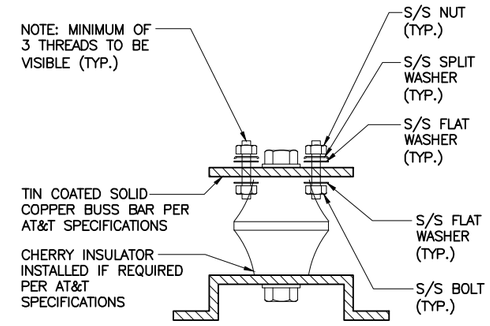
GROUNDING SCHEMATIC SCALE: N.T.S. 1



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



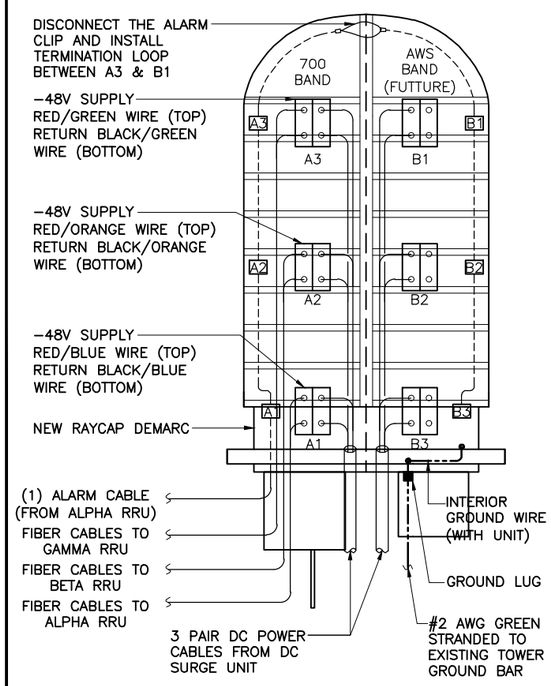
EXOTHERMIC WELD DETAILS SCALE: N.T.S. 4



NOTES:

1. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2. COAT WIRE END WITH ANTI-OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3. APPLY ANTI-OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

LUG DETAIL SCALE: N.T.S. 3



RAYCAP DC POWER AND ALARM DET. SCALE: N.T.S. 5

NOT USED SCALE: N.T.S. 6

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STATE OF CONNECTICUT · BARBARA T. KOTECKI · 33711 · LICENSED PROFESSIONAL ENGINEER

Jun 3 2022

SITE NAME
STRATFORD
ORONOQUE ROAD

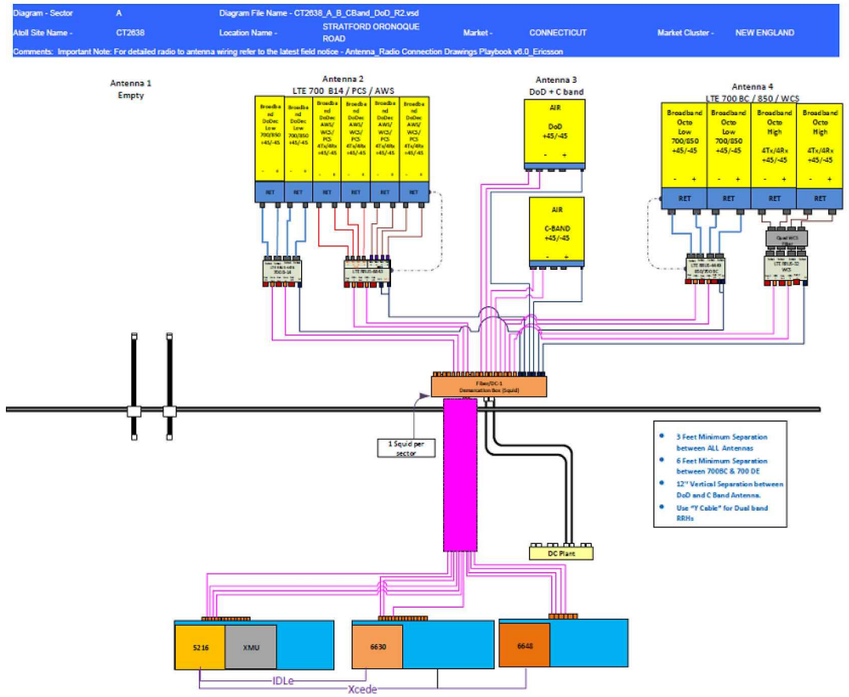
SITE NUMBER:
CTL02638

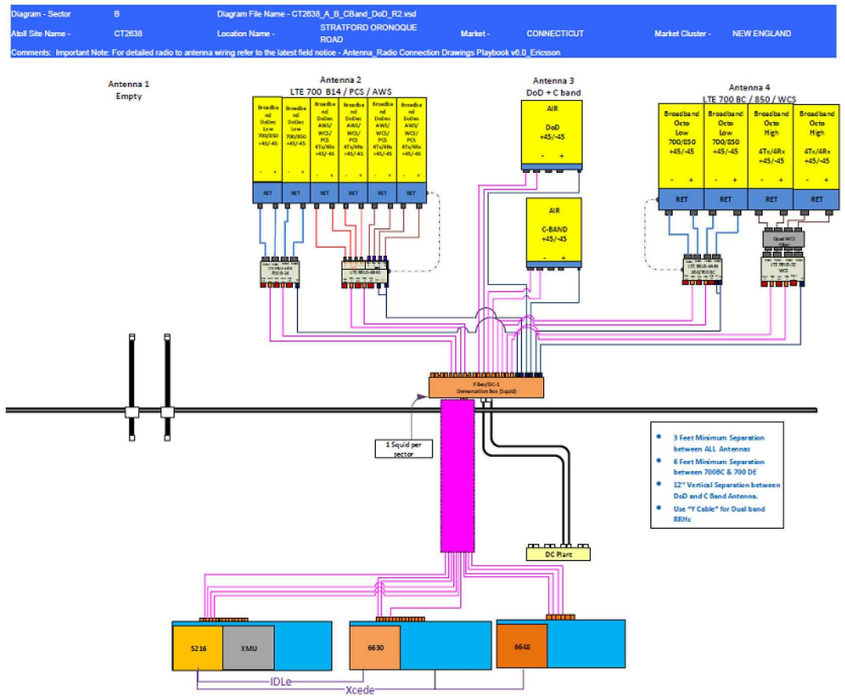
SITE ADDRESS
200 ORONOQUE LANE
STRATFORD, CT 06614

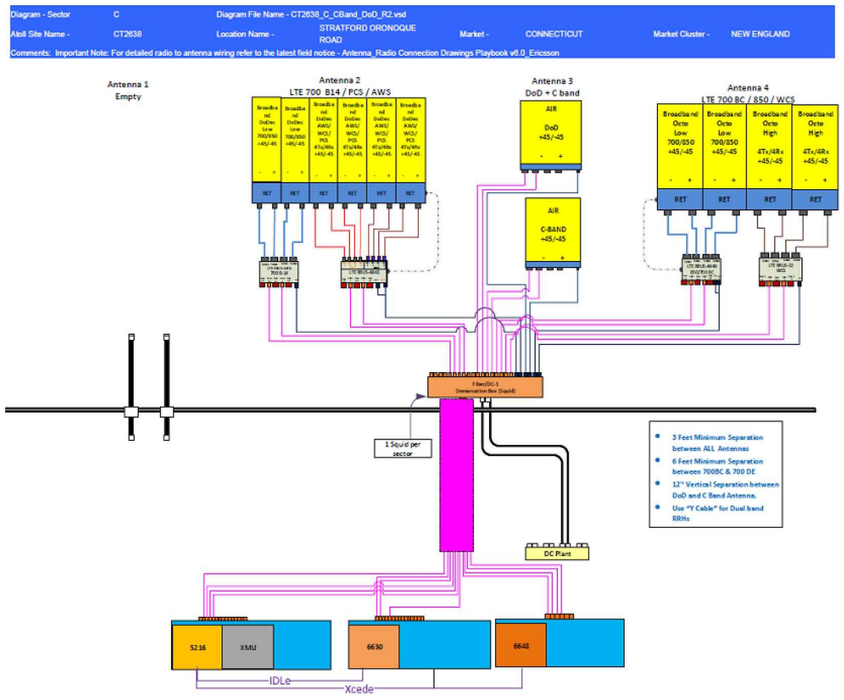
SHEET NAME
GROUNDING DETAILS

SHEET NUMBER
A8

PROJECT# 2021.0215.0011







*BASED ON RFDS V2.0, DATED (05/23/22)

PLUMBING DIAGRAMS

SCALE: N.T.S.

1

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LICENSED PROFESSIONAL ENGINEER

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STRATFORD ORONOQUE ROAD

SITE NUMBER:

CTL02638

SITE ADDRESS

200 ORONOQUE LANE
STRATFORD, CT 06614

SHEET NAME

PLUMBING DIAGRAMS

SHEET NUMBER

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