Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

August 4, 2020

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

RE: Notice of Exempt Modification
5 Perryridge Road, Greenwich, CT 06830
Latitude: 41.0339340000
Longitude: -73.6308290000
T-Mobile Site#: CTFF001A – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 144-foot level of the existing 164-foot monopole at 5 Perryridge Road, Greenwich, CT. The 164-foot monopole and property are owned by Greenwich Hospital. T-Mobile now intends to replace three (3) existing antennas with three (3) new 2500 MHz antennas. The new antennas will be installed at the same 144-foot level of the tower.

Planned Modifications:
Tower:

Remove
(6) 1-5/8" Coax

Remove and Replace:
(3) Ericsson AIR 21 Antenna (Remove) – Ericsson AIR 6449 Antenna (Replace) 2500 MHz

Install New:
(3) Ericsson 4415 RRU
(3) Commscope SDX1926Q-43 Diplexers
(3) 1-5/8" Hybrid Cables

Existing to Remain:
(3) Ericsson AIR 32 Antenna 1900/2100 MHz
(3) RFS APXVARR24_43-U-NA20 Antenna 600/700/1900/2100 MHz
(3) Ericsson 4449 RRU
(3) TMA
(6) 1-5/8" Coax
(3) 1-3/8" Hybrid Cable

Ground:
Install New:
(1) 6160 Cabinet
(1) B160 Battery Cabinet

This tower was originally approved by the Connecticut Siting Council in Docket No. 73 on April 1, 1987. The approval did not include conditions that would be violated by the proposed modification. The modification complies with the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman -Fred Camillo, Elected Official, and Katie DeLuca, Director of Planning and Zoning for the Town of Greenwich, as well as the owner.

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

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

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

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

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

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

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

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

Sincerely,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Fred Camillo – Town of Greenwich First Selectman
Katie DeLuca– Town of Greenwich Director of Planning and Zoning
Greenwich Hospital – tower/property owner

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

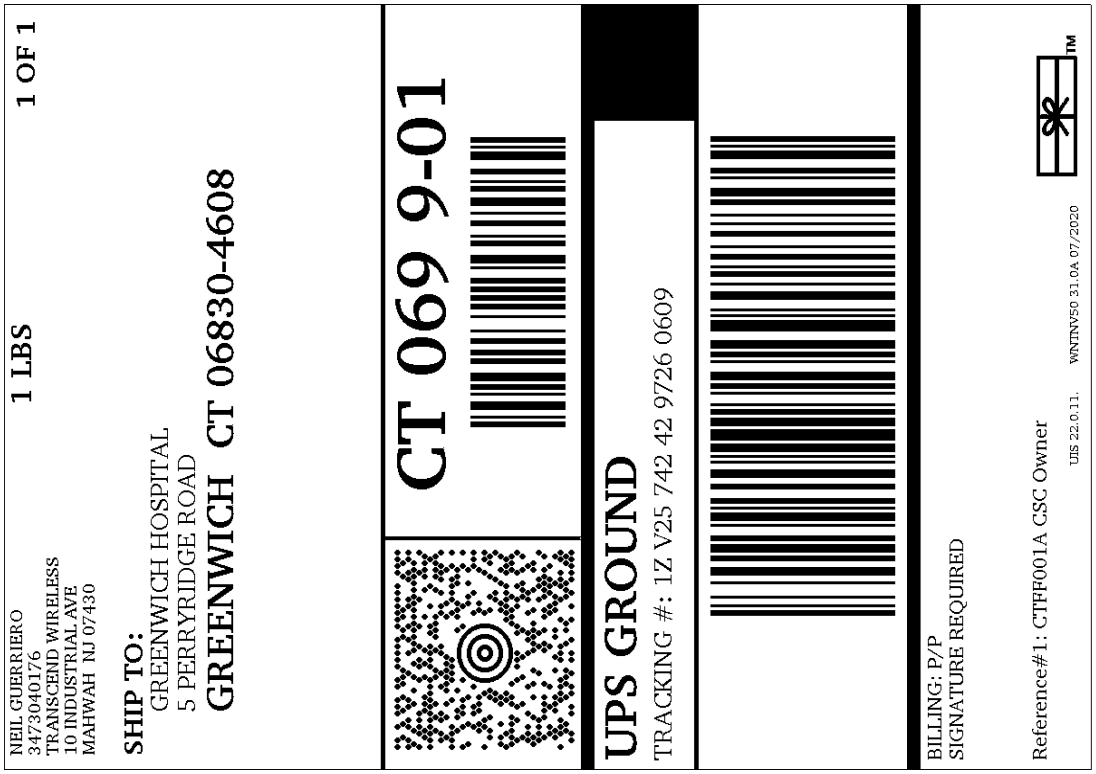
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE



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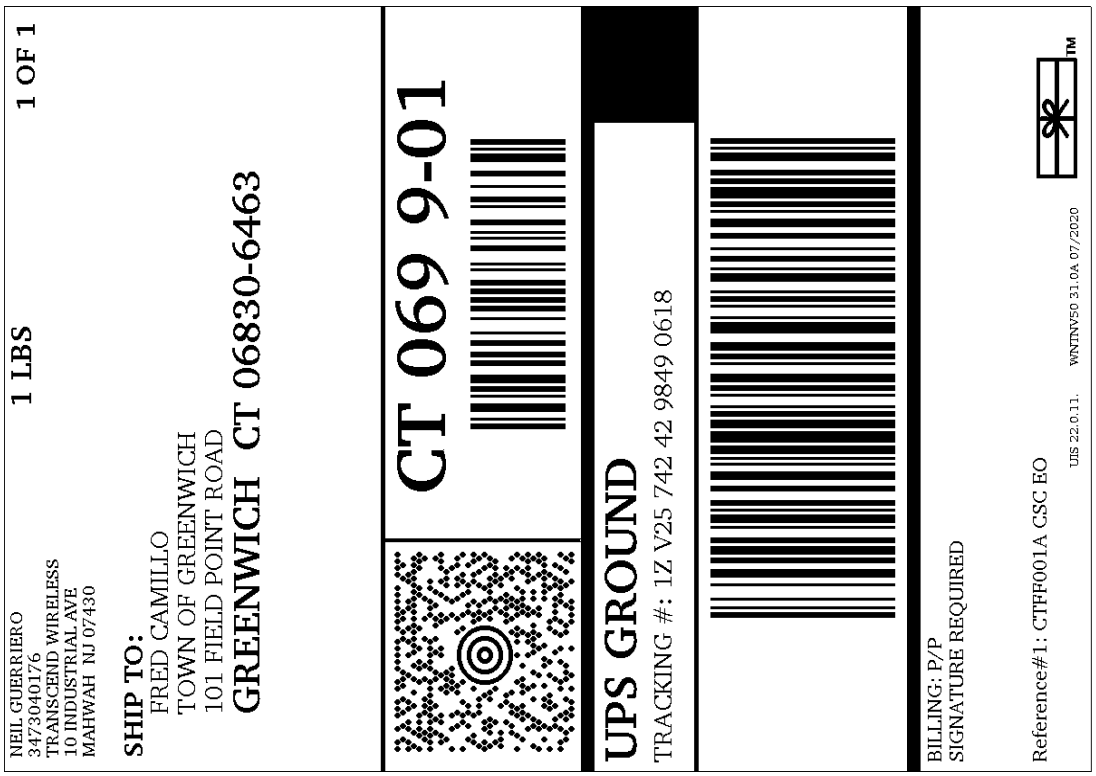

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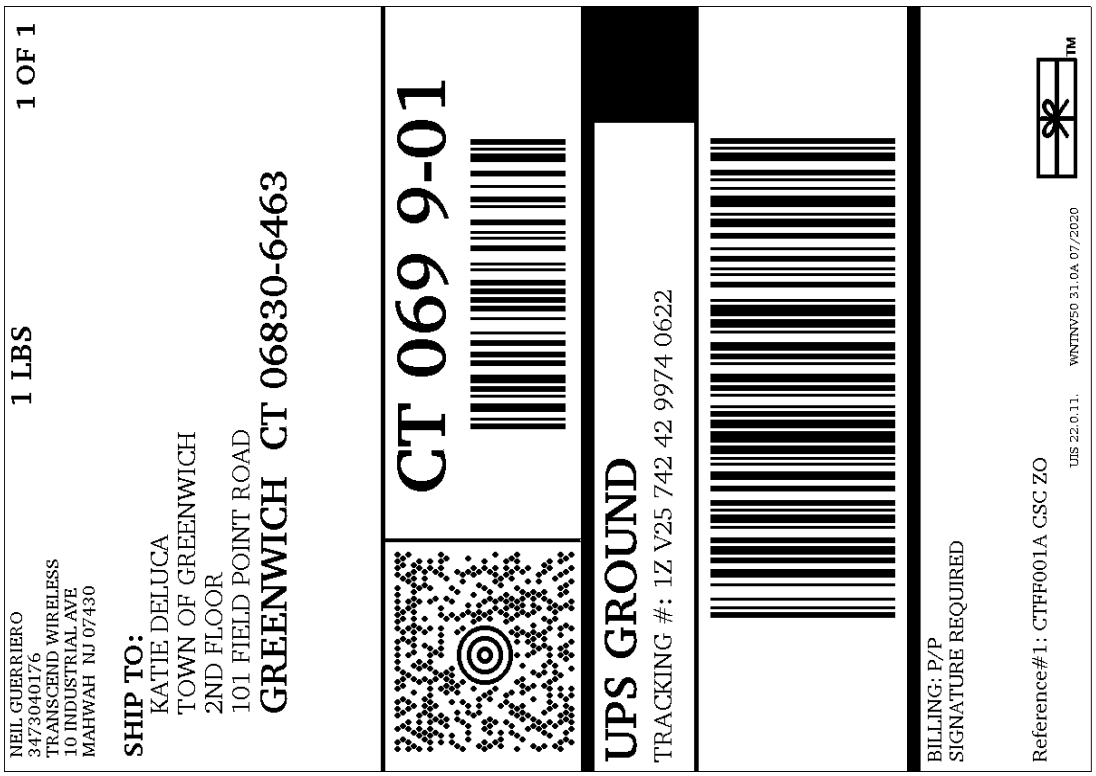


ADMINISTRATIVE INFORMATION

PARCEL NUMBER
07-4009/S

Parent Parcel Number

Property Address
PERRYRIDGE ROAD 0005

Neighborhood
2200 WEST PUTNAM

Property Class
299 Exempt Commercial

TAXING DISTRICT INFORMATION

Jurisdiction	57	Greenwich, CT
Area	001	
Corporation	057	
District	07	
Section & Plat	167	
Routing Number	6578W0001	

Site Description

Topography:

Public Utilities:
Sewer, Electric

Street or Road:

Neighborhood:

Zoning:
H-1 Hospital Zone

Legal Acres:
7.3274

OWNERSHIP

GREENWICH HOSPITAL
C/O NANCYE FRITZ FACILITIES MGMT
5 PERRYRIDGE ROAD
GREENWICH, CT 06830

LOT NO 1 2 3 4 PERRYRIDE RD & LAKE AVE W1 1A

Tax ID 247/113 Printed 07/18/2018 Card No. 1 of 2

TRANSFER OF OWNERSHIP

Date		
01/06/2012	GREENWICH HOSPITAL ASSOCIATION THE $0	Bk/Pg: 6265, 4
07/03/1990	NA $0	Bk/Pg: 2051, 54

EXEMPT

VALUATION RECORD

Assessment Year		10/01/2006	10/01/2007	10/01/2010	10/01/2015	10/01/2015	10/01/2016	10/01/2017
Reason for Change		2006 List	2007 List	2010 Reval	2015 Prelim	2015 Final	2016 List	2017 List
VALUATION	L	11876300	11876300	11846300	13938000	13938000	13938000	13938000
Market	B	255669200	257342000	276895100	355986700	355986700	355986700	355986700
	T	267545500	269218300	288741400	369924700	369924700	369924700	369924700
VALUATION	L	8313410	8313410	8292410	9756600	9756600	9756600	9756600
70% Assessed	B	178968440	180139400	193826570	249190690	249190690	249190690	249190690
	T	187281850	188452810	202118980	258947290	258947290	258947290	258947290

LAND DATA AND CALCULATIONS

Land Type	Rating Soil ID -or- Actual Frontage	Measured Acreage -or- Effective Frontage	Table Effective Depth	Prod. Factor -or- Depth Factor -or- Square Feet	Base Rate	Adjusted Rate	Extended Value	Influence Factor	Value
1 Primary Commercial				319181.38	58.22	58.22	18584000 0	-25%	13938000

BP10: 9-2198 (Hlmsly) Cnvrt lounge to CT/xray rm cmplt; 9-3185 (Wtsn) cnvrt med spc for use as hyperbaric center cmplt; 10-0173 (Hlmsly) create injctn suite for MRI/CT cmplt; 10-0281 (Hmsly/Wtsn) Installation of 22 patient ceil lifts cmplt; 10-0449 Minor int partng cmplt. 10-1908 Minor int alt nvc.
BP11: 10-2842 Clinical sim rm cmplt (Helmsley 2nd flr); 10-3186,10-3677 int alt (Watson 1st & 2nd flr) cmplt; 10-4136 elct eqmnt cmplt PP. 11-0668 Minor alt Emerg Dept access cmplt. 11-1627 3rd flr Helmsley reconfig of 1800 sf spc w/ consolid. of nursing stations. 11-1765 Rplc frnt entry w/ revolv. door. 11-2990 2nd flr Helmsley consolid mult. strg rms into one--not started.
BP12: Helmsley Wing: 11-1627 3rd flr reconfig of 1800 sf for exp of maternity suite, nursing station & parenatology cmplt nvc. 11-2990 2nd flr cnvrt rooms for equip storage area cmplt nvc. Watson Wing: 3rd flr 11-3059 cnvrt corridor to PT/exrcs area

Permit Number / Type	FilingDate	Est. Cost / Est. SqFt	Field Visit

Supplemental Cards

TRUE TAX VALUE 13938000

Supplemental Cards
TOTAL LAND VALUE 13938000

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

ROOFING

Built-up

WALLS

	B	1	2	U
Frame				
Brick	Yes	Yes	Yes	Yes
Metal				
Guard				

FRAMING

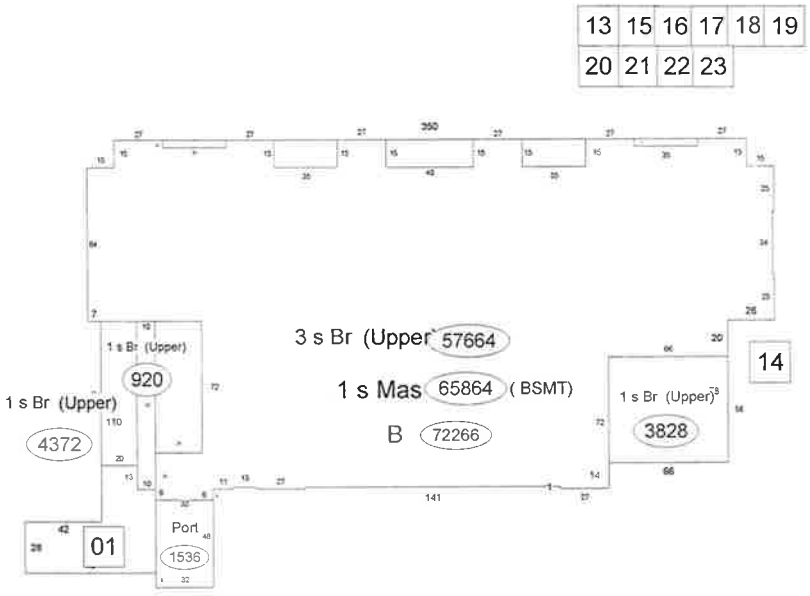
	B	1	2	U
R Conc	72266	65864	0	0
F Prf	0	0	65864	116248

FINISH

	UF	SF	FO	FD
B	72266	0	0	0
1	31346	0	0	34518
2	0	0	0	65864
U	0	0	0	116248
Total	103612	0	0	216630

HEATING AND AIR CONDITIONING

	B	1	2	U
Heat	72266	34518	65864	116248
Sprink	72266	31346	65864	116248



Helmsley Wing


07-4009/S Helmsley East Elev. Looking NW

(LCM: 150.00)

SPECIAL FEATURES

Description	Value
C : Remod 2013	

SUMMARY OF IMPROVEMENTS

ID	Use	Stry Hgt	Const Type	Grade	Year Const	Eff Year	Cond	Base Rate	Feat-ures	Adj Rate	Size or Area	Computed Value	Phys Depr	Obsol Depr	Market Adj	% Comp	Value
C	HOSPITAL	0.00		Exe	1999	2005	EX	0.00	N	0.00	132648	0	0	0	150	100	174540100
01	PAVING	0.00	6	Gd+	1996	1996	AV	6.30	N	15.62	2816	43980	9	0	100	100	40000
13	RTWCONC	12.00	6D	Exe	1999	2000	VG	26.00	N	93.60	12x280	26210	0	0	100	100	26200
14	BusShelt	0.00		Good	2001	2001	GD	0.00	N	0.00	0	16000	0	SV	100	100	16000
15	MEZZFO	1.00		Exe	2004	2005	EX	68.10	N	245.16	12x 22	63250	0	0	100	100	63300
16	ELEVCOM	3.00	2H	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
17	ELEVCOM	2.00	2H	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
18	ELEVCOM	5.00	2E	Exe	1999	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
19	ELEVCOM	4.00	2E	Exe	1999	2005	EX	169000	N	608400	5@ 0	3042000	0	0	100	100	3042000
20	LOADDOCK	3.00	6	Good	2006	2006	GD	22.10	N	49.73	6x 43	12680	0	0	100	100	12700
21	LOADDOCK	3.00	6	Good	2006	2006	GD	22.10	N	49.73	6x 29	8500	0	0	100	100	8500
22	COMCNPYG	0.00		Good	2006	2006	GD	50.00	N	112.50	15x 46	75040	0	0	100	100	75000
23	COMCNPYG	0.00		Good	2006	2006	GD	50.00	N	112.50	15x 32	52200	0	0	100	100	52200

Data Collector/Date
bd 07/22/2013

Appraiser/Date
TOG 10/01/2015

Neighborhood
Neigh 2200 AV

Supplemental Cards
TOTAL IMPROVEMENT VALUE 181526400

TRANSFER OF OWNERSHIP

Date

VALUATION RECORD

Assessment Year

Reason for Change

VALUATION

Site Description

LAND DATA AND CALCULATIONS

Land Type	Rating Soil ID -or- Actual Frontage	Measured Acreage -or- Effective Frontage	Table Effective Depth	Prod. Factor -or- Depth Factor -or- Square Feet	Base Rate	Adjusted Rate	Extended Value	Influence Factor	Value

BP12: Helmsley Wing: 11-1627 3rd flr reconfig of 1800 sf for exp of cmplt nvc. 11-4380 install wiring for patient monitoring syst PP 12-1445 Rmv/Rplc walls for rmvl/rplcmnt of MRI 1st flr Helmsley. 12-2952 Minor int alt/partitions creating ofc from exstg fin area in Watson. 12-3318 Minor int alt for swtch in use.
BP13: 12-3090, 12-4509 elec upgrds/maint and instltn of recept., outlets, cabling, etc for BMDI (Biomedical Device Integration) for remote monitors cmplt. 12-3318 (Helmsley-3rd flr) Create strg rm and gen ofc frm one rm cmplt nvc. 13-5349 Add door beween Nursery and NICU, NVC
BP14: 14-2040, NCV
BP17: Building Permits for 2017
BP 15-2229: Emergency Rm Ren. NVC TD
DBA: Greenwich Hospital
GEN: C02: Helmsley Wing; C03: Voided w/ demo cmplt 4/06 (Original South Wing); C04: Watson Wing; CO3 had 2 bsmt lvls,

Supplemental Cards
TOTAL LAND VALUE

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

ROOFING

Built-up

WALLS

	B	1	2	U
Frame		Yes		
Brick	Yes		Yes	Yes
Metal				
Guard				

FRAMING

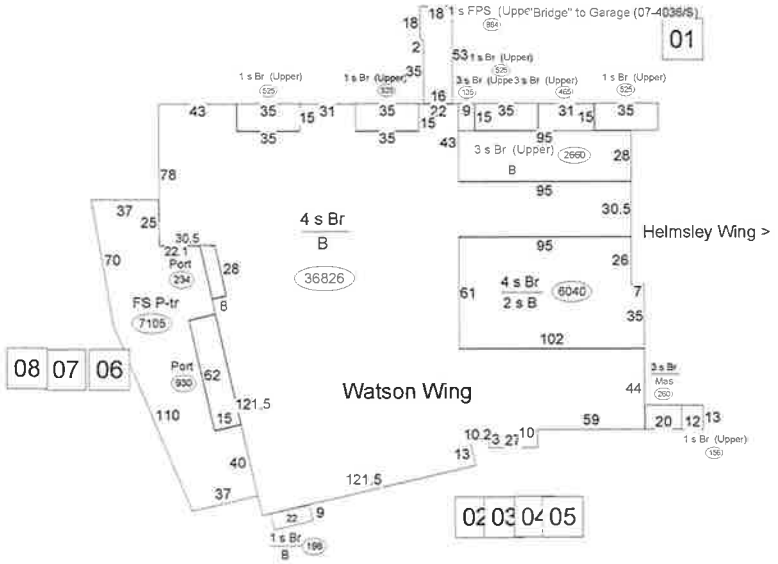
	B	1	2	U
R Conc	51764	0	0	0
F Prf	0	44208	48486	92928

FINISH

	UF	SF	FO	FD
B	51764	0	0	0
1	0	0	0	44208
2	0	0	0	48486
U	0	0	0	92928
Total	51764	0	0	185622

HEATING AND AIR CONDITIONING

	B	1	2	U
Heat	11486	44208	48486	92928
Sprink	51764	44208	48486	92928




07-4009/S Watson East Elev Looking NW

(LCM: 150.00)

SPECIAL FEATURES

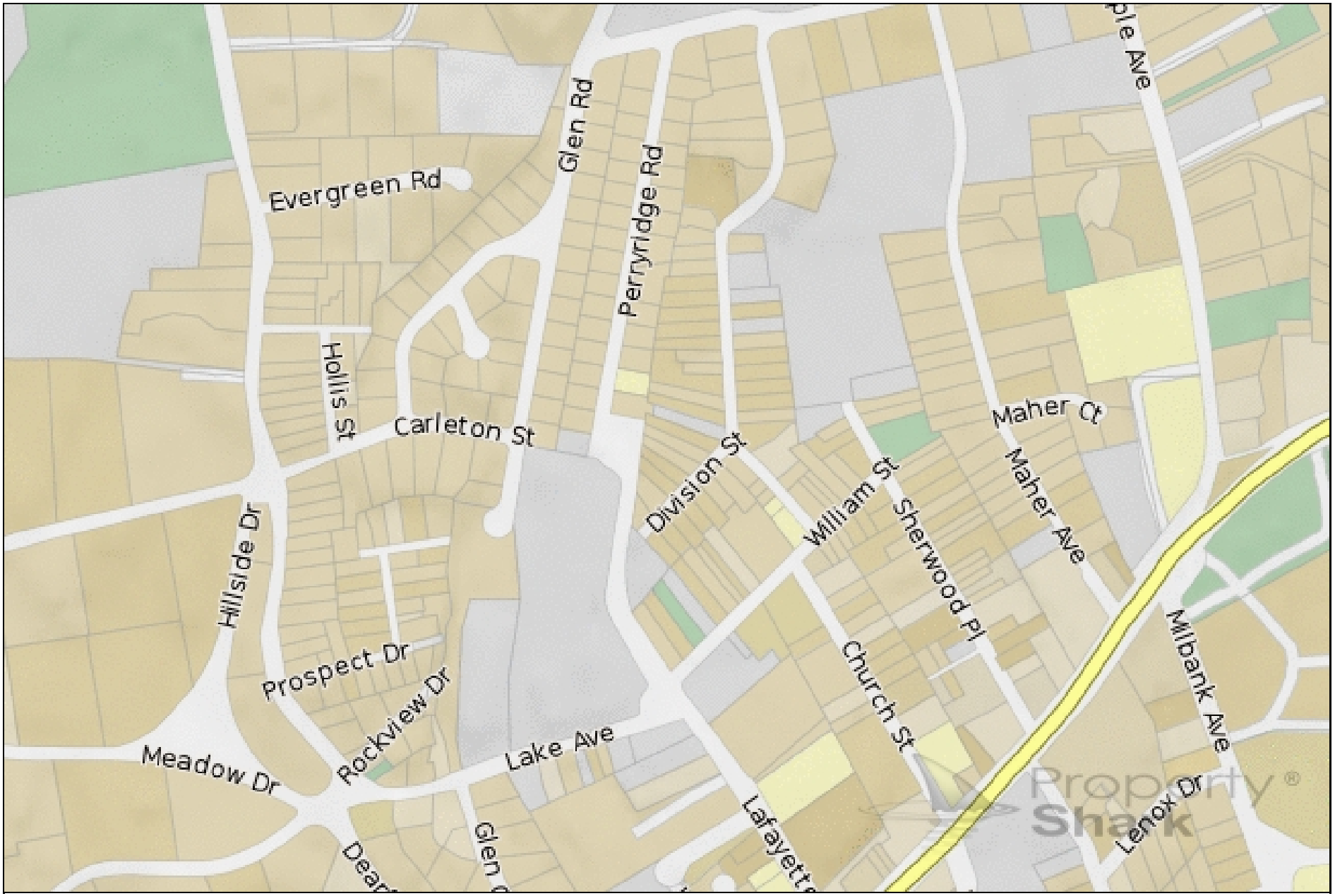
Description	Value
C : Remod 2012	

SUMMARY OF IMPROVEMENTS

ID	Use	Stry Hgt	Const Type	Grade	Year Const	Eff Year	Cond	Base Rate	Feat-ures	Adj Rate	Size or Area	Computed Value	Phys Depr	Obsol Depr	Market Adj	% Comp	Value
C	HOSPITAL	0.00		Exe	2005	2007	EX	0.00	N	0.00	49724	0	0	0	150	100	169931100
01	TOWER	164.00	5PF	Exe	2003	2003	VG	0.00	N	0.00	164	450000	0	SV	100	100	450000
02	ELEVCOM	6.00	2E	Exe	2005	2005	EX	169000	N	608400	3@ 0	1825200	0	0	100	100	1825200
03	ELEVCOM	5.00	2E	Exe	2005	2005	EX	169000	N	608400	2@ 0	1216800	0	0	100	100	1216800
04	ELEVFRT	5.00	2E	Exe	2005	2005	EX	98500	N	354600	1@ 0	354600	0	0	100	100	354600
05	ELEVFRT	6.00	2E	Exe	2005	2005	EX	98500	N	354600	1@ 0	354600	0	0	100	100	354600
06	Pat.Rail	0.00		Exe	2006	2006	EX	0.00	N	0.00	0	3500	0	SV	100	100	3500
07	RTWCONC	10.00	6D	Exe	2006	2006	EX	26.00	N	93.60	10x510	47740	0	0	100	100	47700
08	WALKPAT	0.00	7	Good	2006	2006	GD	15.00	N	33.75	8200	276750	0	0	100	100	276800

Data Collector/Date	Appraiser/Date	Neighborhood	Supplemental Cards TOTAL IMPROVEMENT VALUE	174460300
bd 07/22/2013	TOG 10/01/2015	Neigh 2200 AV		

Place: **Ct - Fairfield** Map/Date rendered: **Parcel Outline (Default) //** Generated: **Wed Apr 18 09:49:04 2018**



Add notes 5 Perryridge Road Dup., Greenwich, CT 06930here ...

DOCKET NO. 73

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

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

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

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

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

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

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

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

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

The parties to the proceeding are:

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

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

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

Southern New England
Telephone Company

(its attorney)

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

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

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

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

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

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

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

ATTEST:

John C. Kelly
Executive Director
Connecticut Siting Council

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

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

FF001/GREENWICH HOSPITAL
SITE ID: CTFF001A
5 PERRYRIDGE RD
GREENWICH, CT 06830

T-MOBILE RF CONFIGURATION

67D5997DB_2xAIR+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

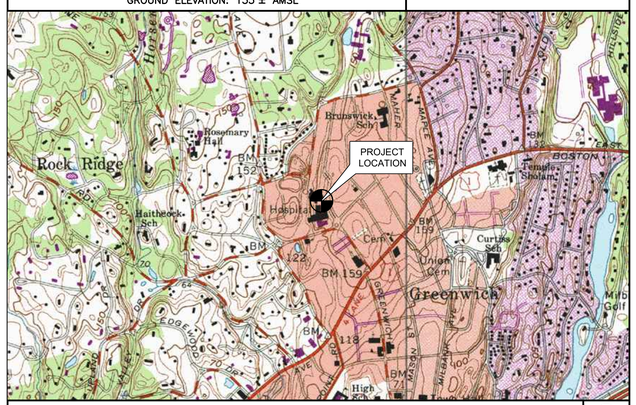
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 5 PERRYRIDGE RD
GREENWICH, CT 06830

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	0.21 MI.
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.14 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT–187	1.89 MI.
4.	TURN LEFT ONTO CT–305/OLD WINDSOR RD.	2.32 MI.
5.	STAY STRAIGHT TO GO ONTO BLOOMFIELD AVE/CT–305.	0.01 MI.
6.	MERGE ONTO I–91 S TOWARD HARTFORD	23.74 MI.
7.	MERGE ONTO CT–15 S VIA EXIT 17 TOWARD E MAIN ST.	59.25 MI.
8.	TAKE THE NORTH ST. EXIT, EXIT 31	0.09 MI.
9.	TURN RIGHT ONTO NORTH ST.	4.16 MI.
10.	TURN RIGHT ONTO N MAPLE AVE.	0.02 MI.
11.	TAKE THE 1ST LEFT ONTO PATTERSON AVE.	0.21 MI.
12.	PATTERSON AVE BECOMES DEER PARK DR.	0.06 MI.
13.	TURN LEFT ONTO PERRYRIDGE RD.	0.35 MI.

SITE COORDINATES: LATITUDE: 41°–2'–3.19" N
LONGITUDE: 73°–37'–50.30" W
GROUND ELEVATION: 135'± AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP — NORTH

PROJECT SUMMARY

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

1. REMOVE (2) NORTEL CABINETS
2. ADD (1) ENCLOSURE 6160
3. ADD (1) iXRe ROUTER
4. ADD (1) BB6630 FOR L2500
5. ADD (1) BB6648 FOR N2500
6. ADD (1) BATTERY CABINET B160
7. REMOVE (6) COAX LINES
8. ADD (3) 6X12 HCS
9. INSTALL AN ADDITONAL (1) BB 6630
10. REPLACE (3) AIR21 ANTENNAS WITH (3) AIR6449 B41 ANTENNAS
11. ADD (3) RADIO 4415 B25
12. ADD (3) COMMSCOPE DIPLEXERS
13. ADD (1) SITEPRO HANDRAIL (P/N: HRK14). CONTRACTOR TO V.I.F. EXISTING PLATFORM FACE WIDTH AND UTILIZE LONGER HORIZONTAL PIPES IF REQUIRED.

PROJECT SUMMARY (STRUCTURAL)

FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S–1 FOR ADDITIONAL DETAILS. HANDRAIL KIT TO BE INSTALLED.

PROJECT INFORMATION

SITE NAME:	FF001/GREENWICH HOSPITAL
SITE ID:	CTFF001A
SITE ADDRESS:	5 PERRYRIDGE RD GREENWICH, CT 06830
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592–8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41°–2'–3.19" N LONGITUDE: 73°–37'–50.30" W GROUND ELEVATION: 135'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
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C–1	SITE LOCATION PLAN	0
C–2	COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION	0
C–3	ANTENNA PLANS	0
C–4	TYPICAL EQUIPMENT DETAILS	0
S–1	STRUCTURAL DETAILS	0
E–1	TYPICAL ELECTRICAL DETAILS	0

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FF001/GREENWICH HOSPITAL
SITE ID: CTFF001A
5 PERRYRIDGE RD
GREENWICH, CT 06830

DATE: 07/14/20
SCALE: AS NOTED
JOB NO. 20074.46

TITLE SHEET

T-1

Sheet No. 1 of 8

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- ULTIMATE DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

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17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "DIG SAFE" (DIAL 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
20. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
21. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

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SITE ID: CTFF001A
5 PERRYRIDGE RD
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DATE: 07/14/20
SCALE: AS NOTED
JOB NO. 20074.46

GENERAL NOTES AND SPECIFICATIONS

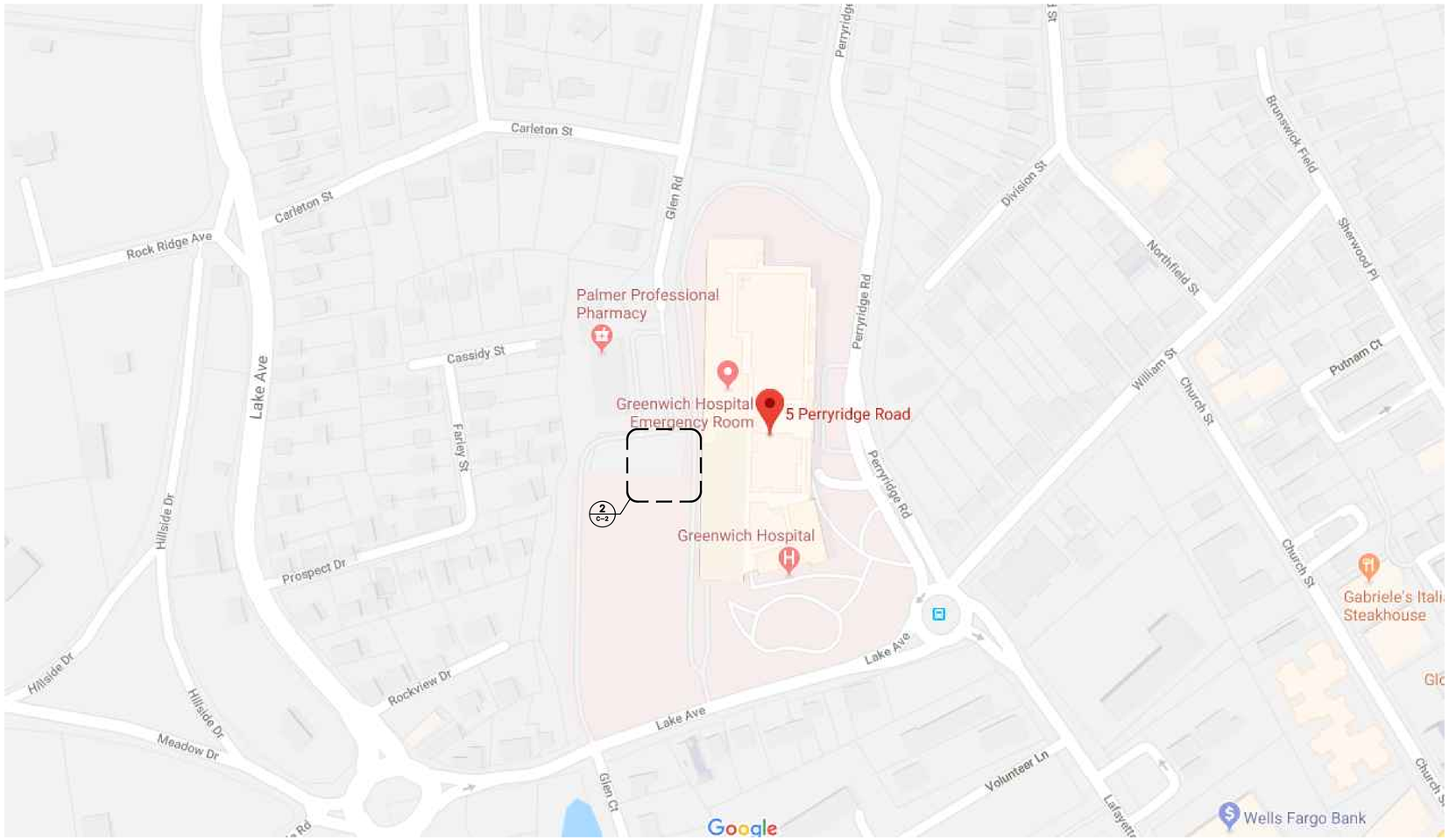
N-1

Sheet No. 2 of 8

NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) DIPLEXERS (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	144'	40°				(1) 6x12 HYBRID CABLE (±150')
A2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	144'	40°	(P) RADIO 4415 B25 (1), (E) RADIO 4449 B71+B85	(P) COMMSCOPE-SDX192 6Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
A3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	144'	40°				
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	144'	140°				(1) 6x12 HYBRID CABLE (±150')
B2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	144'	140°	(P) RADIO 4415 B25 (1), (E) RADIO 4449 B71+B85	(P) COMMSCOPE-SDX192 6Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
B3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	144'	140°				
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	144'	280°				(1) 6x12 HYBRID CABLE (±150')
C2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	144'	280°	(P) RADIO 4415 B25 (1), (E) RADIO 4449 B71+B85	(P) COMMSCOPE-SDX192 6Q-43 (1)	(E) GENERIC TWIN STYLE 1B (1)	
C3	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	144'	280°				



1 C-1 **SITE LOCATION PLAN**
SCALE: NOT TO SCALE
TRUE NORTH

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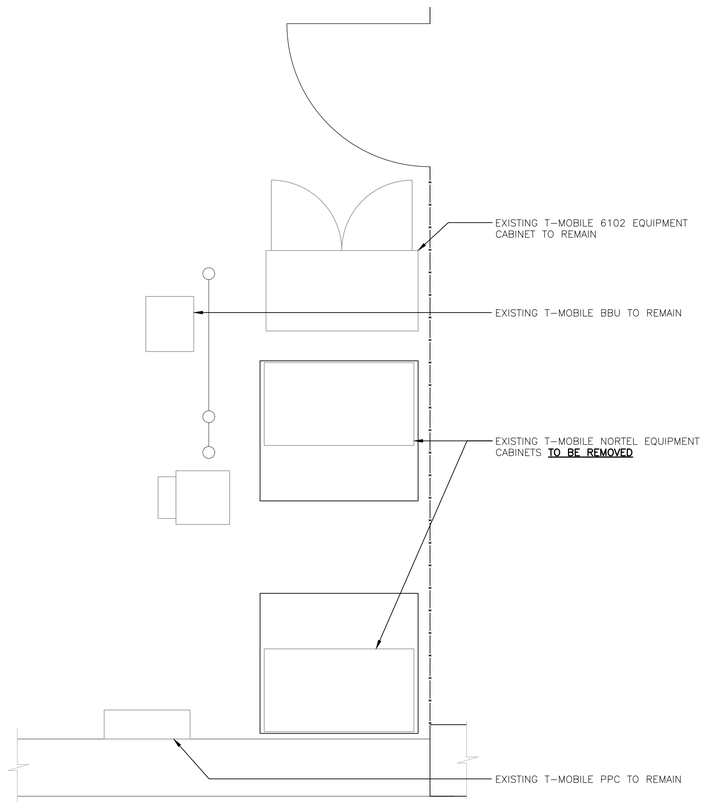
SITE LOCATION PLAN

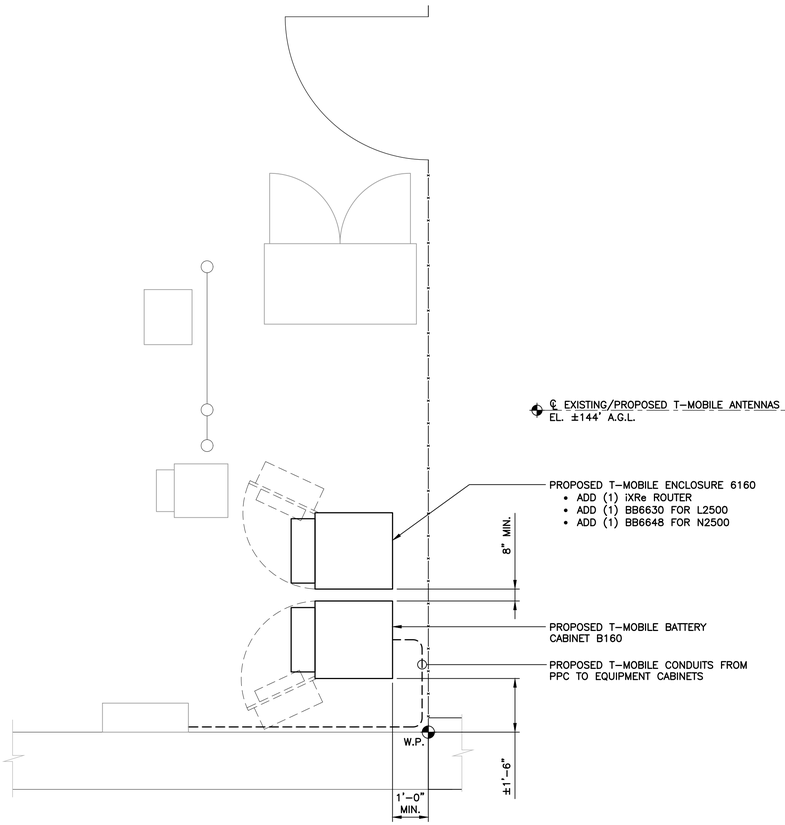
C-1

Sheet No. 3 of 8



3 C-2 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'

APPROXIMATE NORTH



4 C-2 **PROPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'

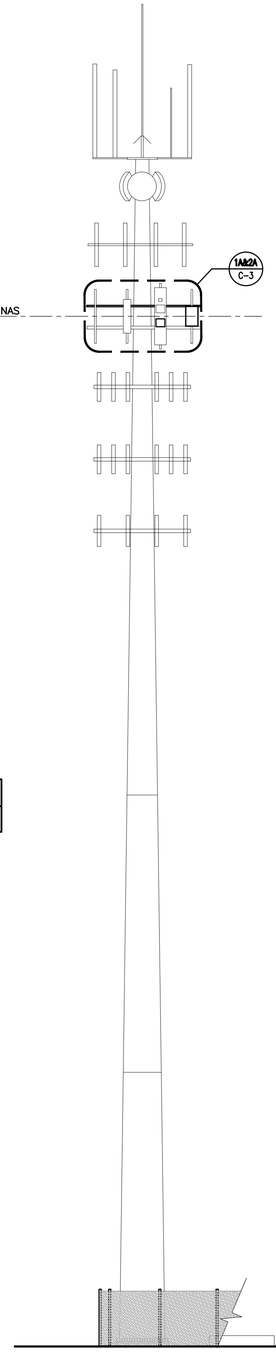
APPROXIMATE NORTH

LEGEND

W.P. DENOTES WORKING POINT.

2 C-2 **PARTIAL COMPOUND PLAN - PROPOSED**
SCALE: 1" = 10'

APPROXIMATE NORTH



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

GRAPHIC SCALE
10 0 5 10 20 40
1" = 10'-0"

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY DEFICIENT AND WARRANTING MODIFICATION PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT. FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S-1 FOR ADDITIONAL DETAILS.

REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.46) DATED 07/13/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.46) DATED 07/13/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

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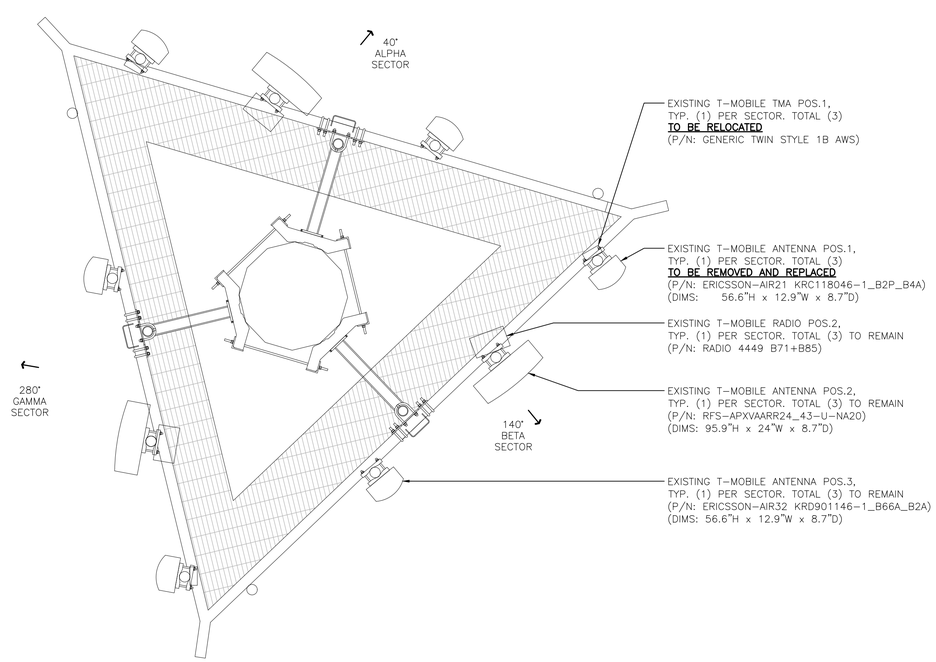
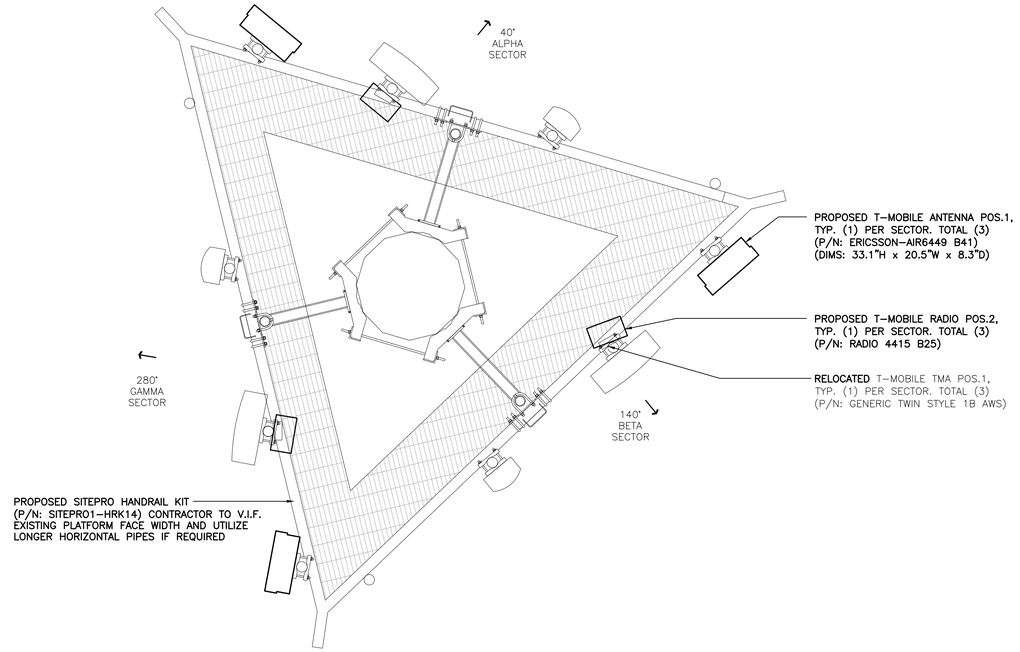
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

Sheet No. 4 of 8



1 C-3 **EQUIPMENT AND ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'



2 C-3 **EQUIPMENT AND ANTENNA PLAN - PROPOSED**
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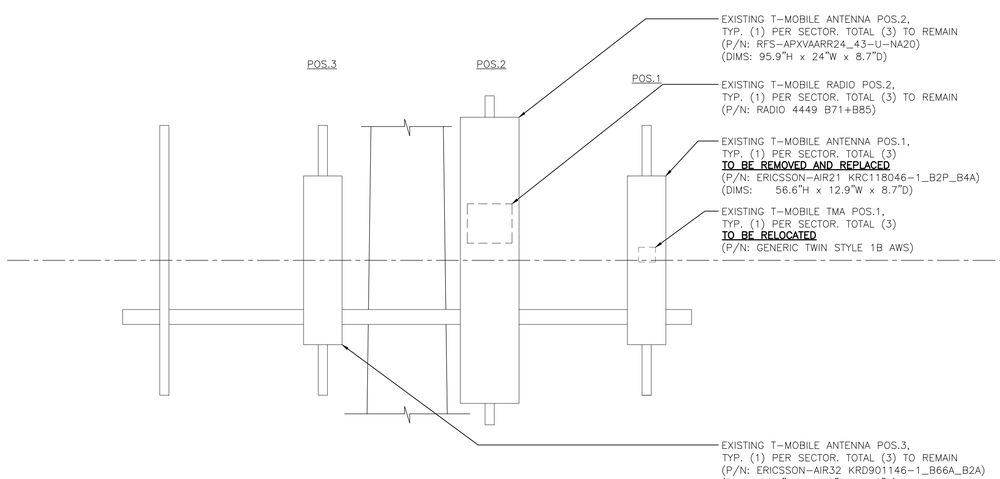
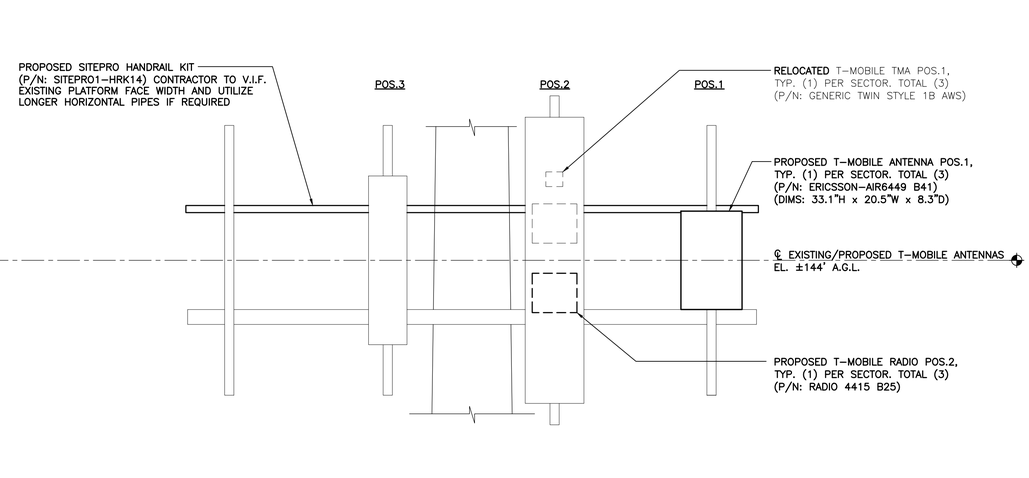


1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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ANTENNA PLANS AND ELEVATIONS

C-3

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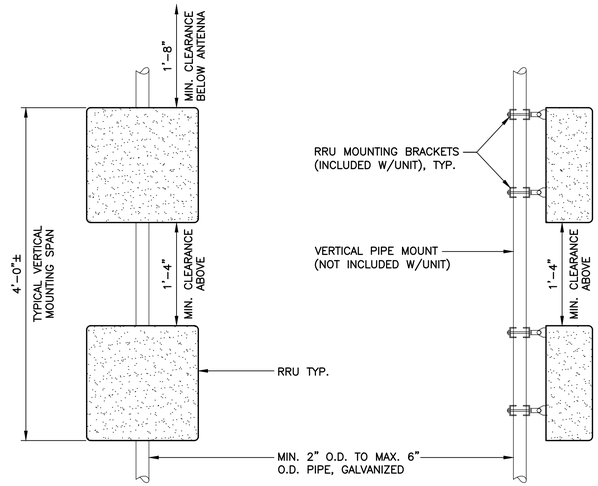
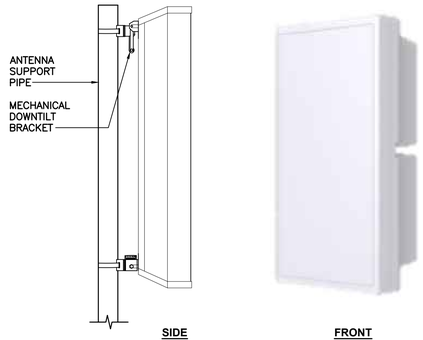


FRONT ELEVATION SIDE ELEVATION

NOTES:

1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / C–4 **TYPICAL RRUS MOUNTING DETAILS**
SCALE: NOT TO SCALE



SIDE

FRONT

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C–4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE

FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4415 B25	14.9"L x 13.2"W x 5.4"D	±46 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

3 / C–4 **PROPOSED RRU DETAIL**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

4 / C–4 **ENCLOSURE 6160 (OUTDOOR)**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 / C–4 **BATTERY CABINET DETAIL**
NOT TO SCALE

DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: SDZ1926Q–43(E14F05P86)	4.2"L x 7.0"W x 3.0"D	–
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

6 / C–4 **PROPOSED DIPLEXER DETAIL**
SCALE: NOT TO SCALE

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TYPICAL EQUIPMENT DETAILS

C-4

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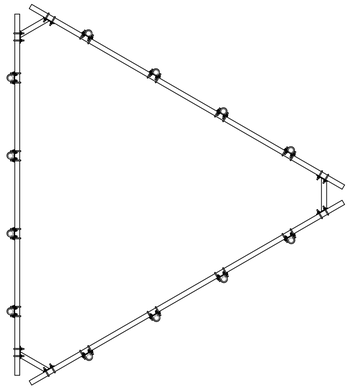

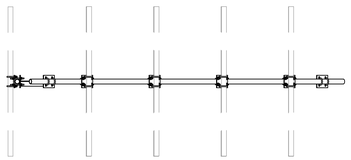

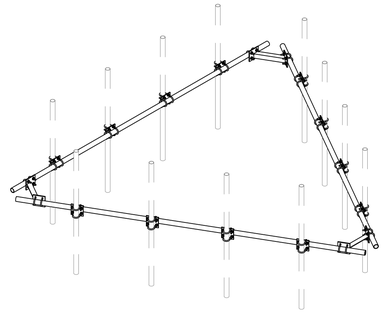

HANDRAIL KIT
FOR 14' 6" FACE

HRK14

SITE PRO 1
A valmont COMPANY

1 / S-1 **PROPOSED HAND-RAIL KIT. (P/N: HRK14)**
SITEPRO P/N: HRK14

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STRUCTURAL DETAILS

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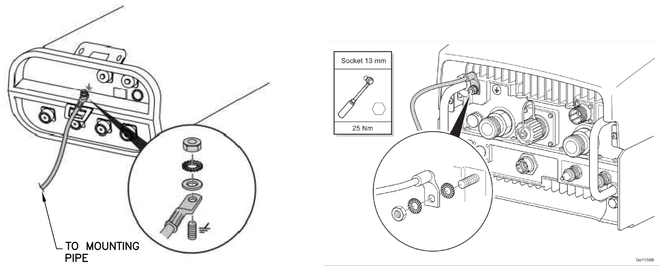
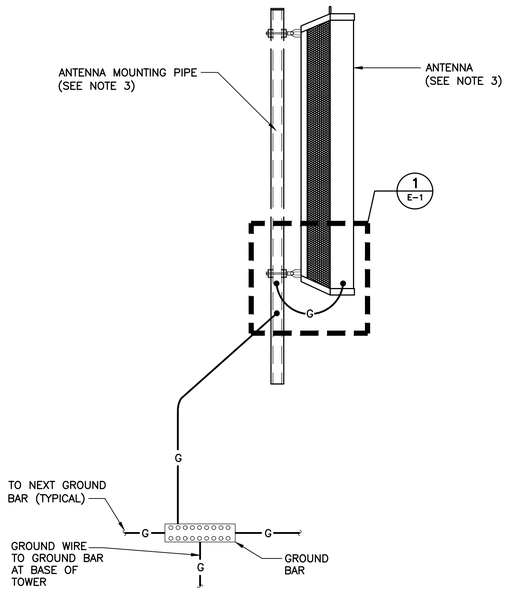


1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE

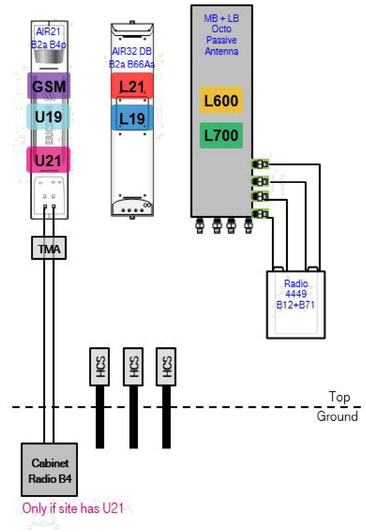


NOTES:

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

2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

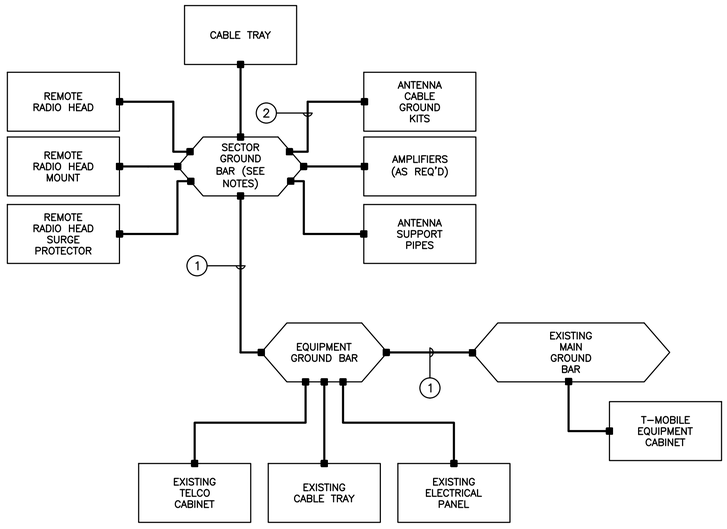
SCALE: NOT TO SCALE



Only if site has U21

3 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

(2) #6 AWG

GENERAL NOTES:

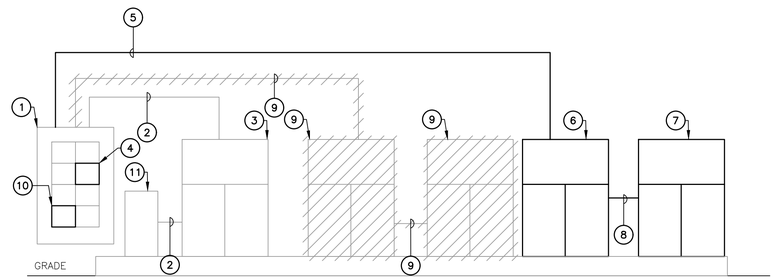
1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

(1) EXISTING 200A, PPC CABINET TO REMAIN.
(2) EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
(3) EXISTING EQUIPMENT CABINET TO REMAIN.
(4) NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
(5) (3) #1 AWG, (1) #8 AWG GROUND, 1–1/4" CONDUIT.
(6) NEW RADIO EQUIPMENT CABINET.
(7) NEW BATTERY CABINET.
(8) DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
(9) EXISTING CABINETS AND ASSOCIATED CONDUITS AND CONDUCTORS TO BE REMOVED
(10) EXISTING 125A/2P CIRCUIT BREAKER SERVING EXISTING EQUIPMENT CABINET TO BE REMOVED AND REPLACED WITH NEW 100A/2P CIRCUIT BREAKER. COORDINATE CABINET DOWNGRADE WITH CONSTRUCTION MANAGER.
(11) EXISTING BBU CABINET TO REMAIN.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 8 of 8

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

164-ft Existing EEI Monopole

Proposed T-Mobile
Antenna Upgrade

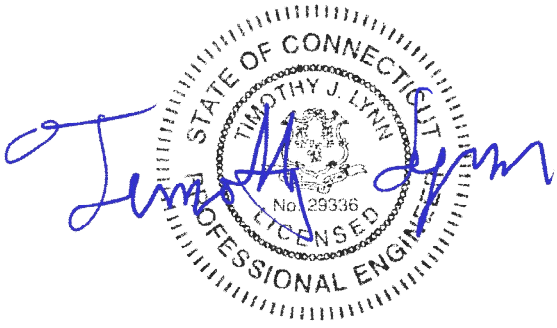
Site Ref: CTFF001A

5 Perryridge Road
Greenwich, CT

CENTEK Project No. 20074.46

Date: July 13, 2020

Max Stress Ratio = 60.3%



Prepared for:

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Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing monopole (tower) owned and operated by Greenwich Hospital located in Greenwich, Connecticut.

The host tower is a 164-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 11030 dated August 21, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained a previous structural analysis report prepared by Centek job no. 19027.10 dated April 25, 2019 and a T-Mobile RF sheet.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The bottom four (4) vertical tower sections are slip joint connected while the top section is flange connected. The diameter of the pole (flat-flat) is 47.0-in at the top and 76.0-in at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (EXISTING TO REMAIN):
  Antennas: Four (4) 12-ft Omni-directional whip antennas, one (1) Sinclair SC229-SFXLDF Omni-directional whip antenna, two (2) Sinclair SC479-HF1LDF Omni-directional whip antennas, one (1) Bird 432E-83I-01-T tower top amplifier and one (1) camera mounted on a PiROD 13-ft low profile platform with an elevation of 164-ft above grade level.
  Coax Cables: Two (2) 1/2"∅, two (2) 7/8"∅, six (6) 1-1/4" ∅ and one (1) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: Two (2) 4-ft Dishes and one (1) 2-ft Dish mounted on three 4'x4" pipes with a RAD center elevation of 160-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- CLEARWIRE (EXISTING):
  Antennas: Three (3) Argus LLPX310R panel antennas, three (3) Samsung FDD-R6-RRH, two (2) Dragonwave Horizon ODU's and two (2) Dragonwave A-ANT-23-G-2-C dishes mounted on the Sprint 13-ft low profile platform with a RAD center elevation of 154-ft above the existing tower base plate.
  Coax Cables: Two (2) 2" ∅ conduits and two (2) 5/8" ∅ coax cables running on the inside of the existing tower.

- SPRINT (EXISTING):
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLPP-RR-A panel antennas, three (3) RFS APXVTM14 panel antennas and one (1) GPS antenna mounted to a low profile platform with a RAD center elevation of 154-ft above the existing tower base plate. Three (3) ALU 1900 MHz RRH's, three (3) ALU 800 MHz RRH's and three (3) ALU TD-RRH-820 remote radio heads mounted on a universal tr-bracket below the existing low profile platform.
  Coax Cables: Six (6) 1-5/8" ∅ Hybriflex cables and one (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- EVERSOURCE ENERGY (EXISTING):
  Antennas: Two (2) Decibel DB586-Y omni-directional whips (one upright and one inverted), one (1) Telewave ANT150F2 omni-directional whip, one (1) Comprod 531-70HD dipole and one (1) tower top amplifier mounted on a PiROD 13-ft low profile platform with an elevation of 114-ft above grade level.
  Coax Cables: Two (2) 1-5/8" ∅, two (2) 7/8" ∅ and one (1) 1/2" ∅ coax cables running on the inside of the existing tower on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: Three GPS antennas mounted on three (3) standoffs with a RAD center elevation of 50-ft above grade level.
  Coax Cables: Three (3) 7/8" ∅ coax cables running on the exterior of the existing tower.
- AT&T (EXISTING):
  Antennas: Three (3) Powerwave 7770.00 panel antennas, three (3) Quintel QS66512 panel antennas, three (3) Kathrein 80010965 panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas, six (6) LGP21401 TMA's, six (6) CCI TPX-070821 triplexers and three (3) Ericsson RRUS-32-B2 remote radio heads, three (3) Ericsson RRUS-32-B66 remote radio heads, three (3) Ericsson B14 4478 remote radio heads, three (3) ION-M23 RRHs, three (3) Commscope CBC23SR-43 diplexers and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on a 16-ft low profile platform with a RAD center elevation of 134-ft above grade level. Three (3) Ericsson RRUS-11 remote radio heads, three (3) Ericsson RRUS-32 remote radio heads and two (2) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
  Cables: Twelve (12) 1-5/8" ∅ coax cables, two (2) fiber cable and six (6) dc control cables running on the inside of the existing tower.
- VERIZON (EXISTING):
  Antennas: Six (6) Decibel DB844G65ZAXY panel antennas, three (3) Samsung CBRS panel antennas, six (6) Quintel QS6656-5D panel antennas, three (3) Samsung B2/B66 remote radio heads, three (3) Samsung B5/B13 remote radio heads, three (3) Samsung CBRS remote radio heads and two (2) Raycap RC2DC-3315-PF-48 main distribution boxes mounted on a 13-ft low profile platform with a RAD center elevation of 124-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cables running inside the monopole.

- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson 4449 remote radio units and three (3) TMAs mounted on a low profile platform with a RAD center elevation of 144-ft above grade level.
  Cables: Six (6) 1-5/8" ∅ coax cables inside the monopole and three (3) 6x12 fiber cables on the exterior of the existing tower.
- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Three (3) Ericsson AIR21 panel antennas mounted on a low profile platform with a RAD center elevation of 144-ft above grade level.
  Cables: Six (6) 1-5/8" ∅ coax cables inside the monopole.
- **T-MOBILE (PROPOSED):**
  Antennas: Three (3) Ericsson AIR6449 panel antennas, Ericsson 4415 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on a low profile platform with a RAD center elevation of 144-ft above grade level. (SitePro handrail (p/n HRK14), using 16-ft long horizontal pipes, to be installed on platform)
  Cables: Three (3) 6x12 fiber cables on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Fairfield; v = 90-110 mph	*[Annex B of TIA-222-G-2005]*
	Greenwich; v = 93 mph	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 93 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **46.8%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L5)	1.50'-39.88'	46.8%	**PASS**

Foundation and Anchors

The existing foundation consists of a 9.0 ∅ x 28.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 11030 dated August 21, 2002. The base of the tower is connected to the foundation by means of (30) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	56 kips
	Compression	105 kips
	Moment	6351 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	58.8%	**PASS**
	Lateral Deflection	0.23 in.(1)	**PASS**

(1) Lateral deflection limited to 0.75 in under service load combination per TIA-222-G section 9.5.

- The flange bolts and plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	51.2%	**PASS**
Flange Plate	Bending	43.1%	**PASS**

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	38.5%	**PASS**
Base Plate	Bending	60.3%	**PASS**

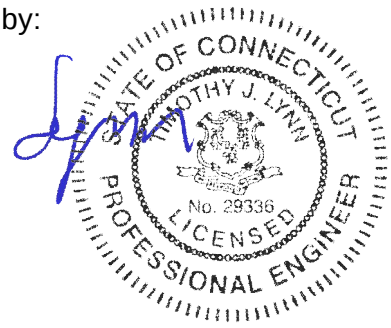
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

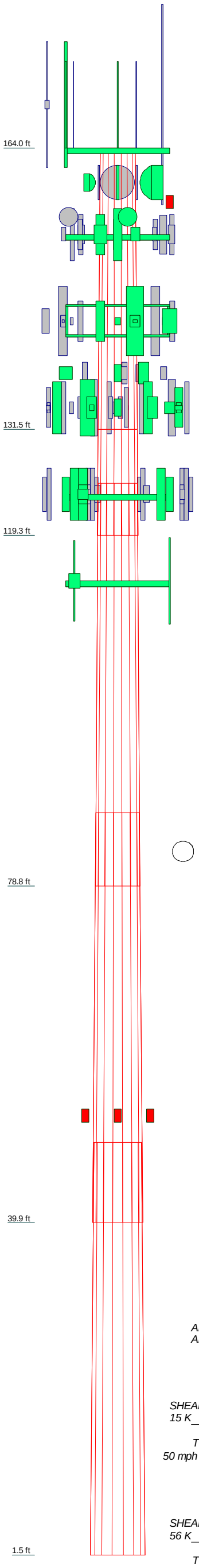
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	32.50	18	0.3125		47.0000	53.4200		5.5
2	12.21	18	0.3750	6.00	53.4200	56.1500		2.7
3	46.50	18	0.4375	8.42	54.0585	62.9700	A572-65	12.8
4	47.33	18	0.5625	9.25	60.4813	69.6600		18.5
5	47.63	18	0.5625		66.7412	76.0000		20.5
								60.0



ALL REACTIONS ARE FACTORED

AXIAL 170 K
SHEAR 15 K
MOMENT 1759 kip-ft
TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 105 K
SHEAR 56 K
MOMENT 6351 kip-ft
TORQUE 4 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' x 3" Dia Omni (Town Existing)	164	DC6-48-60-18-8F Surge Arrestor (ATI Existing)	138
12' x 3" Dia Omni (Town Existing)	164	DC6-48-60-18-8F Surge Arrestor (ATI Existing)	138
12' x 3" Dia Omni (Town Existing)	164	RRUS-11 (ATI Existing)	138
12' x 3" Dia Omni (Town Existing)	164	RRUS-11 (ATI Existing)	138
Camera (Town Existing)	164	RRUS-11 (ATI Existing)	138
SC479-HF1LDF (Town Existing)	164	QS66512-2 (ATI Existing)	134
TX/RX 432E-83I-01T (Town Existing)	164	80010965 (ATI Existing)	134
SC229-SFXLDF (Town Existing)	164	P65-16-XLH-RR (ATI Existing)	134
SC479-HF1LDF (Town Existing)	164	7770.00 (ATI Existing)	134
Low Profile Platform (Town Existing)	164	QS66512-2 (ATI Existing)	134
4'x4" Pipe Mount (Town Existing)	160	80010965 (ATI Existing)	134
4'x4" Pipe Mount (Town Existing)	160	P65-16-XLH-RR (ATI Existing)	134
4'x4" Pipe Mount (Town Existing)	160	(2) LGP21401 TMA (ATI Existing)	134
4 FT DISH (Town Existing)	160	(2) LGP21401 TMA (ATI Existing)	134
4 FT DISH (Town Existing)	160	(2) LGP21401 TMA (ATI Existing)	134
2 FT DISH (Town Existing)	160	(2) TPX-070821 (ATI Existing)	134
Horizon ODU (Clearwire Existing)	154	(2) TPX-070821 (ATI Existing)	134
Horizon ODU (Clearwire Existing)	154	(2) TPX-070821 (ATI Existing)	134
APXVSPP18-C-A20 (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
P40-16-XLPP-RR-A (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
APXVSPP18-C-A20 (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	RRUS-32 (ATI Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	B14 4478 (ATI Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	B14 4478 (ATI Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	B14 4478 (ATI Existing)	134
GPS (Sprint Existing)	154	RRU (ATI Existing)	134
APXVTM14 (Sprint Existing)	154	RRU (ATI Existing)	134
APXVTM14 (Sprint Existing)	154	RRU (ATI Existing)	134
APXVTM14 (Sprint Existing)	154	CBC23SR-43 (ATI Existing)	134
TD-RRH8x20-25 (Sprint Existing)	154	CBC23SR-43 (ATI Existing)	134
TD-RRH8x20-25 (Sprint Existing)	154	CBC23SR-43 (ATI Existing)	134
TD-RRH8x20-25 (Sprint Existing)	154	DC6-48-60-18-8F Surge Arrestor (ATI Existing)	134
Low Profile Platform (Sprint Existing)	154	EEI 16-ft Low Profile Platform (ATI Existing)	134
LLPX310R (Clearwire Existing)	154	7770.00 (ATI Existing)	134
LLPX310R (Clearwire Existing)	154	QS66512-2 (ATI Existing)	134
LLPX310R (Clearwire Existing)	154	80010965 (ATI Existing)	134
A-Ant-23G-2-C (Clearwire Existing)	154	P65-16-XLH-RR (ATI Existing)	134
A-Ant-23G-2-C (Clearwire Existing)	154	7770.00 (ATI Existing)	134
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	(2) QS66512 (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	CBRS Antenna (Verizon Existing)	124
Valmont Uni-Tri Bracket (Sprint Existing)	151.5	DB844G65ZAXY (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	DB844G65ZAXY (Verizon Existing)	124
AIR32 (T-Mobile Existing)	144	(2) QS66512 (Verizon Existing)	124
AIR6449 (T-Mobile Propoed)	144	CBRS Antenna (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Existing)	144	DB844G65ZAXY (Verizon Existing)	124
AIR32 (T-Mobile Existing)	144	B2/B66A RRH (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Existing)	144	B2/B66A RRH (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Existing)	144	B2/B66A RRH (Verizon Existing)	124
Radio 4449 B71 B12 (T-Mobile Existing)	144	B5/B15 RRH -BRO4C (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	B5/B15 RRH -BRO4C (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	B5/B15 RRH -BRO4C (Verizon Existing)	124
TMA 10"x8"x3" (T-Mobile Existing)	144	RRU (Verizon Existing)	124
4415 B25 (T-Mobile Proposed)	144	RRU (Verizon Existing)	124
4415 B25 (T-Mobile Proposed)	144	RRU (Verizon Existing)	124
4415 B25 (T-Mobile Proposed)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
SDX1926Q-43 (T-Mobile Proposed)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
SDX1926Q-43 (T-Mobile Proposed)	144	Low Profile Platform (Verizon Existing)	124
SDX1926Q-43 (T-Mobile Proposed)	144	DB844G65ZAXY (Verizon Existing)	124
EEI 16-ft Platform w/ Handrail (T-Mobile Existing)	144	(2) QS66512 (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Existing)	144	CBRS Antenna (Verizon Existing)	124
AIR32 (T-Mobile Existing)	144	DB844G65ZAXY (Verizon Existing)	124
AIR6449 (T-Mobile Propoed)	144	DB844G65ZAXY (Verizon Existing)	124
APXVAARR24-43 (T-Mobile Existing)	144	Low Profile Platform	114
AIR6449 (T-Mobile Propoed)	144	531-70HD (Eversource Existing)	114
RRUS-32 (ATI Existing)	138	DB586-Y (Eversource Existing)	114
RRUS-32 (ATI Existing)	138	DB586-Y (Eversource Existing)	114
RRUS-32 (ATI Existing)	138	ANT150F2 (Eversource Existing)	114
Valmont Uni-Tri Bracket (ATI Existing)	138	Tower Top Amplifier (Eversource Existing)	114
		GPS	51.5
		GPS	51.5
		GPS	51.5

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 46.8%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***20074.46 - CTFF001A***		
Project:	***164' EEI Monopole - 5 Perryridge Rd., Greenwich, CT***		
Client: T-Mobile	Drawn by: TJL		App'd:
Code: TIA-222-G	Date: 07/13/20		Scale: NTS
Path: J:\Jobs\2007400.WI\46_CTFF001A\05_Structural\Tower Analysis\Backup Documentation\ERI Files\164' EEI Monopole Greenwich, CT.eri			Dwg No. E-1

Tower Input Data

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

Basic wind speed of 93 mph.
Structure Class III.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 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.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	164.00-131.50	32.50	0.00	18	47.0000	53.4200	0.3125	1.2500	A572-65 (65 ksi)
L2	131.50-119.29	12.21	6.00	18	53.4200	56.1500	0.3750	1.5000	A572-65 (65 ksi)
L3	119.29-78.79	46.50	8.42	18	54.0585	62.9700	0.4375	1.7500	A572-65 (65 ksi)
L4	78.79-39.88	47.33	9.25	18	60.4813	69.6600	0.5625	2.2500	A572-65 (65 ksi)
L5	39.88-1.50	47.63		18	66.7412	76.0000	0.5625	2.2500	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	47.6768	46.3082	12752.5270	16.5741	23.8760	534.1149	25521.8341	23.1585	7.7220	24.71
	54.1959	52.6760	18769.9004	18.8532	27.1374	691.6627	37564.4987	26.3430	8.8519	28.326
L2	54.1862	63.1368	22444.4518	18.8310	27.1374	827.0684	44918.4365	31.5744	8.7419	23.312
	56.9584	66.3862	26091.2194	19.8001	28.5242	914.7047	52216.7704	33.1994	9.2224	24.593
L3	55.9925	74.4594	27047.4669	19.0354	27.4617	984.9157	54130.5236	37.2368	8.7443	19.987
	63.8739	86.8342	42898.2727	22.1990	31.9888	1341.0421	85852.9920	43.4253	10.3127	23.572
L4	62.9857	106.9776	48524.0652	21.2712	30.7245	1579.3269	97111.9796	53.4990	9.6547	17.164
	70.6478	123.3649	74413.8720	24.5296	35.3873	2102.8424	148925.659 7	61.6942	11.2702	20.036
L5	69.5098	118.1537	65376.3617	23.4934	33.9045	1928.2498	130838.747 4	59.0881	10.7564	19.123
	77.0856	134.6842	96834.1984	26.7803	38.6080	2508.1382	193795.813 7	67.3549	12.3860	22.02

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 164.00-131.50				1	1	1			
L2 131.50-119.29				1	1	1			
L3 119.29-78.79				1	1	1			
L4 78.79-39.88				1	1	1			
L5 39.88-1.50				1	1	1			

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
7/8	B	No	Surface Ar (CaAa)	51.50 - 4.50	3	3	0.000 0.000	1.1100		0.54
HYBRIFLEX 1-5/8"	B	No	Surface Ar	144.00 -	3	3	0.000	1.9800		1.90

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
(T-Mobile - Proposed)			(CaAa)	7.50			0.000			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2 (Town Existing)	A	No	No	Inside Pole	164.00 - 4.50	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25
1 1/4 (Town Existing)	A	No	No	Inside Pole	164.00 - 4.50	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.66 0.66 0.66
1/2 (Sprint Existing)	B	No	No	Inside Pole	154.00 - 7.50	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25
2" Rigid Conduit (Clearwire Existing)	B	No	No	Inside Pole	154.00 - 7.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	2.80 2.80 2.80
LDF4.5-50 (5/8 FOAM) (Clearwire Existing)	B	No	No	Inside Pole	154.00 - 7.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
1 5/8 (T-Mobile Existing)	B	No	No	Inside Pole	144.00 - 4.50	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
1 5/8 (AT&T Existing)	A	No	No	Inside Pole	134.00 - 11.50	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
1 5/8 (Verizon Existing)	C	No	No	Inside Pole	124.00 - 7.50	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
RG6-Fiber (AT&T Existing)	A	No	No	Inside Pole	134.00 - 11.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00
#8 AWG Copper WIre (AT&T Existing)	A	No	No	Inside Pole	134.00 - 11.50	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00
HYBRIFLEX 1-5/8" (Sprint Existing)	B	No	No	Inside Pole	154.00 - 7.50	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.90 1.90 1.90
HYBRIFLEX 1-5/8" (Verizon Existing)	C	No	No	Inside Pole	124.00 - 7.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.90 1.90 1.90
7/8 (Eversource Existing)	C	No	No	Inside Pole	114.00 - 1.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.54 0.54 0.54
1 5/8 (Eversource Existing)	C	No	No	Inside Pole	114.00 - 1.50	2	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.04 1.04 1.04
1/2 (Eversource Existing)	C	No	No	Inside Pole	114.00 - 1.50	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25
HYBRIFLEX 1-5/8" (T-Mobile - Existing)	B	No	No	Inside Pole	144.00 - 7.50	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.90 1.90 1.90
1 5/8	A	No	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	1.04

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(Town Existing)							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
7/8	A	No	No	Inside Pole	164.00 - 4.50	2	No Ice	0.00	0.54
(Town Existing)							1/2" Ice	0.00	0.54
							1" Ice	0.00	0.54
1/2	A	No	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	0.25
(Town Existing)							1/2" Ice	0.00	0.25
							1" Ice	0.00	0.25
#8 AWG Copper	A	No	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.05
WIre							1/2" Ice	0.00	0.05
(AT&T Existing)							1" Ice	0.00	0.05

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	7.425	0.000	0.62
		C	0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.000	0.000	0.000	0.000	0.23
		B	0.000	0.000	7.253	0.000	0.43
		C	0.000	0.000	0.000	0.000	0.08
L3	119.29-78.79	A	0.000	0.000	0.000	0.000	0.78
		B	0.000	0.000	24.057	0.000	1.43
		C	0.000	0.000	0.000	0.000	0.78
L4	78.79-39.88	A	0.000	0.000	0.000	0.000	0.75
		B	0.000	0.000	26.982	0.000	1.39
		C	0.000	0.000	0.000	0.000	0.77
L5	39.88-1.50	A	0.000	0.000	0.000	0.000	0.59
		B	0.000	0.000	31.015	0.000	1.22
		C	0.000	0.000	0.000	0.000	0.66

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	2.178	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	16.087	0.000	0.85
		C		0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	2.143	0.000	0.000	0.000	0.000	0.23
		B		0.000	0.000	15.607	0.000	0.65
		C		0.000	0.000	0.000	0.000	0.08
L3	119.29-78.79	A	2.092	0.000	0.000	0.000	0.000	0.78
		B		0.000	0.000	51.766	0.000	2.16
		C		0.000	0.000	0.000	0.000	0.78
L4	78.79-39.88	A	1.988	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	60.159	0.000	2.21
		C		0.000	0.000	0.000	0.000	0.77
L5	39.88-1.50	A	1.793	0.000	0.000	0.000	0.000	0.59

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	72.449	0.000	2.14
		C		0.000	0.000	0.000	0.000	0.66

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	164.00-131.50	1.7936	-1.0355	1.8344	-1.0591
L2	131.50-119.29	4.0510	-2.3388	3.9042	-2.2541
L3	119.29-78.79	4.0901	-2.3614	3.9843	-2.3003
L4	78.79-39.88	4.7430	-2.7384	4.7482	-2.7414
L5	39.88-1.50	5.3785	-3.1053	5.5408	-3.1990

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	22	HYBRIFLEX 1-5/8"	131.50 - 144.00	1.0000	1.0000
L2	22	HYBRIFLEX 1-5/8"	119.29 - 131.50	1.0000	1.0000
L3	11	7/8	78.79 - 51.50	1.0000	1.0000
L3	22	HYBRIFLEX 1-5/8"	78.79 - 119.29	1.0000	1.0000
L4	11	7/8	39.88 - 51.50	1.0000	1.0000
L4	22	HYBRIFLEX 1-5/8"	39.88 - 78.79	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 K
4'x4" Pipe Mount	A	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00			1" Ice	1.84	1.84	0.07
4'x4" Pipe Mount	B	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	1.84	1.84	0.07
4'x4" Pipe Mount	C	From Face	0.50	0.0000	160.00	No Ice	1.10	1.10	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00			1" Ice	1.84	1.84	0.07
12' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			0.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	B	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			-6.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	C	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			6.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
12' x 3" Dia Omni	C	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			0.00			1/2" Ice	4.83	4.83	0.06
			5.00			1" Ice	6.08	6.08	0.09
Camera	B	From Face	4.00	0.0000	164.00	No Ice	3.00	3.00	0.10
(Town Existing)			-6.00			1/2" Ice	4.00	4.00	0.15
			2.00			1" Ice	5.00	5.00	0.20
SC479-HF1LDF	A	From Face	4.00	0.0000	164.00	No Ice	4.70	4.70	0.03
(Town Existing)			-6.00			1/2" Ice	6.54	6.54	0.07
			5.00			1" Ice	8.04	8.04	0.11
TX/RX 432E-83I-01T	A	From Face	4.00	0.0000	164.00	No Ice	1.20	0.75	0.03
(Town Existing)			-6.00			1/2" Ice	1.34	0.86	0.04
			5.00			1" Ice	1.48	0.98	0.05
SC229-SFXLDF	B	From Face	4.00	0.0000	164.00	No Ice	6.67	6.67	0.03
(Town Existing)			0.00			1/2" Ice	9.02	9.02	0.08
			5.00			1" Ice	11.39	11.39	0.14
SC479-HF1LDF	C	From Face	4.00	0.0000	164.00	No Ice	4.70	4.70	0.03
(Town Existing)			6.00			1/2" Ice	6.54	6.54	0.07
			5.00			1" Ice	8.04	8.04	0.11
Low Profile Platform	C	None		0.0000	164.00	No Ice	15.70	15.70	1.30
(Town Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
LLPX310R	A	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
LLPX310R	B	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
LLPX310R	C	From Face	3.00	0.0000	154.00	No Ice	4.30	1.95	0.03
(Clearwire Existing)			0.00			1/2" Ice	4.60	2.21	0.05
			0.00			1" Ice	4.90	2.49	0.08
Remote Radio Head FD R6	A	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Remote Radio Head FD R6	B	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Remote Radio Head FD R6	C	From Face	3.00	0.0000	151.50	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00			1" Ice	2.18	1.07	0.06
Horizon ODU	A	None		0.0000	154.00	No Ice	0.68	0.16	0.00
(Clearwire Existing)						1/2" Ice	0.78	0.22	0.00
						1" Ice	0.89	0.29	0.01
Horizon ODU	C	None		0.0000	154.00	No Ice	0.68	0.16	0.00
(Clearwire Existing)						1/2" Ice	0.78	0.22	0.00

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 K
						1" Ice	0.89	0.29	0.01
APXVSPP18-C-A20	A	From Face	4.00	0.0000	154.00	No Ice	8.02	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
P40-16-XLPP-RR-A	B	From Face	4.00	0.0000	154.00	No Ice	9.07	3.52	0.05
(Sprint Existing)			0.00			1/2" Ice	9.47	3.87	0.11
			0.00			1" Ice	9.87	4.22	0.16
APXVSPP18-C-A20	C	From Face	4.00	0.0000	154.00	No Ice	8.02	5.28	0.06
(Sprint Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
FD-RRH 4x45 1900	A	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Face	4.00	0.0000	154.00	No Ice	2.32	2.38	0.06
(Sprint Existing)			2.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 2x50 800	A	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	C	From Face	4.00	0.0000	154.00	No Ice	2.06	1.93	0.06
(Sprint Existing)			-2.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
GPS	C	From Face	4.00	0.0000	154.00	No Ice	1.00	1.00	0.01
(Sprint Existing)			-6.00			1/2" Ice	1.50	1.50	0.01
			3.00			1" Ice	2.00	2.00	0.02
APXVTM14	A	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Face	4.00	0.0000	154.00	No Ice	6.34	3.61	0.06
(Sprint Existing)			2.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
TD-RRH8x20-25	A	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Face	4.00	0.0000	154.00	No Ice	4.05	1.53	0.07
(Sprint Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Valmont Uni-Tri Bracket	A	None		0.0000	151.50	No Ice	1.75	1.75	0.29
(Sprint Existing)						1/2" Ice	1.94	1.94	0.31
						1" Ice	2.13	2.13	0.32
Low Profile Platform	C	None		0.0000	154.00	No Ice	15.70	15.70	1.30
(Sprint Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
AIR6449	A	From Face	4.00	0.0000	144.00	No Ice	5.65	2.42	0.10
(T-Mobile Propoed)			-6.00			1/2" Ice	5.96	2.64	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	6.26	2.87	0.18
APXVAARR24-43	A	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.15
(T-Mobile Existing)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	A	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Existing)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR6449	B	From Face	4.00	0.0000	144.00	No Ice	5.65	2.42	0.10
(T-Mobile Propoed)			-6.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAARR24-43	B	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.15
(T-Mobile Existing)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	B	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Existing)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR6449	C	From Face	4.00	0.0000	144.00	No Ice	5.65	2.42	0.10
(T-Mobile Propoed)			-6.00			1/2" Ice	5.96	2.64	0.14
			0.00			1" Ice	6.26	2.87	0.18
APXVAARR24-43	C	From Face	4.00	0.0000	144.00	No Ice	20.24	8.89	0.15
(T-Mobile Existing)			-2.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
AIR32	C	From Face	4.00	0.0000	144.00	No Ice	6.51	4.71	0.13
(T-Mobile Existing)			2.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
Radio 4449 B71 B12	A	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Existing)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Existing)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Face	4.00	0.0000	144.00	No Ice	1.64	1.29	0.07
(T-Mobile Existing)			-2.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
TMA 10"x8"x3"	A	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	B	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	C	From Face	4.00	0.0000	144.00	No Ice	0.67	0.26	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
4415 B25	A	From Face	4.00	0.0000	144.00	No Ice	1.84	0.82	0.05
(T-Mobile Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
4415 B25	B	From Face	4.00	0.0000	144.00	No Ice	1.84	0.82	0.05
(T-Mobile Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
4415 B25	C	From Face	4.00	0.0000	144.00	No Ice	1.84	0.82	0.05
(T-Mobile Proposed)			-2.00			1/2" Ice	2.01	0.94	0.06
			0.00			1" Ice	2.19	1.07	0.08
SDX1926Q-43	A	From Face	4.00	0.0000	144.00	No Ice	0.24	0.10	0.03
(T-Mobile Proposed)			-2.00			1/2" Ice	0.31	0.14	0.03
			0.00			1" Ice	0.38	0.19	0.04
SDX1926Q-43	B	From Face	4.00	0.0000	144.00	No Ice	0.24	0.10	0.03
(T-Mobile Proposed)			-2.00			1/2" Ice	0.31	0.14	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1" Ice	0.38	0.19	0.04
SDX1926Q-43	C	From Face	4.00		0.0000	144.00	No Ice	0.24	0.10	0.03
(T-Mobile Proposed)			-2.00				1/2" Ice	0.31	0.14	0.03
			0.00				1" Ice	0.38	0.19	0.04
EEI 16-ft Platform w/	C	None			0.0000	144.00	No Ice	26.00	26.00	2.30
Handrail							1/2" Ice	32.00	32.00	2.75
(T-Mobile Existing)							1" Ice	38.00	38.00	3.20
DC6-48-60-18-8F Surge	B	From Face	0.50		0.0000	138.00	No Ice	1.91	1.91	0.02
Arrestor			0.00				1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00				1" Ice	2.29	2.29	0.06
DC6-48-60-18-8F Surge	C	From Face	0.50		0.0000	138.00	No Ice	1.91	1.91	0.02
Arrestor			0.00				1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00				1" Ice	2.29	2.29	0.06
RRUS-11	A	From Face	0.50		0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00				1/2" Ice	2.76	1.21	0.07
			0.00				1" Ice	2.97	1.36	0.09
RRUS-11	B	From Face	0.50		0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00				1/2" Ice	2.76	1.21	0.07
			0.00				1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	0.50		0.0000	138.00	No Ice	2.57	1.07	0.05
(AT&T Existing)			6.00				1/2" Ice	2.76	1.21	0.07
			0.00				1" Ice	2.97	1.36	0.09
RRUS-32	A	From Face	0.50		0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	0.50		0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50		0.0000	138.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-3.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
Valmont Uni-Tri Bracket	C	None			0.0000	138.00	No Ice	1.75	1.75	0.29
(AT&T Existing)							1/2" Ice	1.94	1.94	0.31
							1" Ice	2.13	2.13	0.32
7770.00	A	From Face	3.00		0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00				1/2" Ice	5.87	3.27	0.07
			0.00				1" Ice	6.23	3.63	0.11
QS66512-2	A	From Face	3.00		0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50				1/2" Ice	8.59	7.27	0.17
			0.00				1" Ice	9.05	7.72	0.23
80010965	A	From Face	3.00		0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50				1/2" Ice	14.35	6.32	0.19
			0.00				1" Ice	14.89	6.82	0.27
P65-16-XLH-RR	A	From Face	3.00		0.0000	134.00	No Ice	8.13	4.70	0.06
(AT&T Existing)			7.00				1/2" Ice	8.59	5.15	0.11
			0.00				1" Ice	9.05	5.60	0.16
7770.00	B	From Face	3.00		0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00				1/2" Ice	5.87	3.27	0.07
			0.00				1" Ice	6.23	3.63	0.11
QS66512-2	B	From Face	3.00		0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50				1/2" Ice	8.59	7.27	0.17
			0.00				1" Ice	9.05	7.72	0.23
80010965	B	From Face	3.00		0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50				1/2" Ice	14.35	6.32	0.19
			0.00				1" Ice	14.89	6.82	0.27
P65-16-XLH-RR	B	From Face	3.00		0.0000	134.00	No Ice	8.13	4.70	0.06
(AT&T Existing)			7.00				1/2" Ice	8.59	5.15	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	9.05	5.60	0.16
7770.00	C	From Face	3.00	0.0000	134.00	No Ice	5.51	2.93	0.04
(AT&T Existing)			-7.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	C	From Face	3.00	0.0000	134.00	No Ice	8.13	6.80	0.11
(AT&T Existing)			-3.50			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
80010965	C	From Face	3.00	0.0000	134.00	No Ice	13.81	5.83	0.11
(AT&T Existing)			3.50			1/2" Ice	14.35	6.32	0.19
			0.00			1" Ice	14.89	6.82	0.27
P65-16-XLH-RR	C	From Face	3.00	0.0000	134.00	No Ice	8.13	4.70	0.06
(AT&T Existing)			7.00			1/2" Ice	8.59	5.15	0.11
			0.00			1" Ice	9.05	5.60	0.16
(2) LGP21401 TMA	A	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	B	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) LGP21401 TMA	C	From Face	3.00	0.0000	134.00	No Ice	0.82	0.35	0.02
(AT&T Existing)			-2.00			1/2" Ice	0.94	0.44	0.02
			0.00			1" Ice	1.06	0.54	0.03
(2) TPX-070821	A	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	B	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
(2) TPX-070821	C	From Face	3.00	0.0000	134.00	No Ice	0.47	0.10	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.56	0.15	0.01
			0.00			1" Ice	0.66	0.20	0.02
RRUS-32	A	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			3.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	A	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Face	0.50	0.0000	134.00	No Ice	3.31	2.42	0.08
(AT&T Existing)			-4.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
B14 4478	A	From Face	0.50	0.0000	134.00	No Ice	1.84	1.06	0.06
(AT&T Existing)			-6.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
B14 4478	B	From Face	0.50	0.0000	134.00	No Ice	1.84	1.06	0.06
(AT&T Existing)			-6.00			1/2" Ice	2.01	1.20	0.08
			0.00			1" Ice	2.19	1.34	0.09
B14 4478	C	From Face	0.50	0.0000	134.00	No Ice	1.84	1.06	0.06
(AT&T Existing)			-6.00			1/2" Ice	2.01	1.20	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.19	1.34	0.09
RRU	A	From Face	0.50	0.0000	134.00	No Ice	1.80	0.78	0.03
(AT&T Existing)			3.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
RRU	B	From Face	0.50	0.0000	134.00	No Ice	1.80	0.78	0.03
(AT&T Existing)			3.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
RRU	C	From Face	0.50	0.0000	134.00	No Ice	1.80	0.78	0.03
(AT&T Existing)			3.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
CBC23SR-43	A	From Face	0.50	0.0000	134.00	No Ice	0.42	0.15	0.01
(AT&T Existing)			3.00			1/2" Ice	0.50	0.20	0.01
			0.00			1" Ice	0.59	0.27	0.01
CBC23SR-43	B	From Face	0.50	0.0000	134.00	No Ice	0.42	0.15	0.01
(AT&T Existing)			3.00			1/2" Ice	0.50	0.20	0.01
			0.00			1" Ice	0.59	0.27	0.01
CBC23SR-43	C	From Face	0.50	0.0000	134.00	No Ice	0.42	0.15	0.01
(AT&T Existing)			3.00			1/2" Ice	0.50	0.20	0.01
			0.00			1" Ice	0.59	0.27	0.01
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	134.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T Existing)			0.00			1" Ice	2.29	2.29	0.06
EEI 16-ft Low Profile	C	None		0.0000	134.00	No Ice	21.00	21.00	2.00
Platform						1/2" Ice	26.00	26.00	2.40
(AT&T Existing)						1" Ice	31.00	31.00	2.80
DB844G65ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
(2) QS66512	A	From Face	4.00	0.0000	124.00	No Ice	8.13	6.80	0.11
(Verizon Existing)			0.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
CBRS Antenna	A	From Face	4.00	0.0000	124.00	No Ice	1.72	1.17	0.03
(Verizon Existing)			4.00			1/2" Ice	1.93	1.44	0.05
			0.00			1" Ice	2.14	1.71	0.07
DB844G65ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
DB844G65ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
(2) QS66512	B	From Face	4.00	0.0000	124.00	No Ice	8.13	6.80	0.11
(Verizon Existing)			0.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
CBRS Antenna	B	From Face	4.00	0.0000	124.00	No Ice	1.72	1.17	0.03
(Verizon Existing)			4.00			1/2" Ice	1.93	1.44	0.05
			0.00			1" Ice	2.14	1.71	0.07
DB844G65ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
DB844G65ZAXY	C	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			-6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
(2) QS66512	C	From Face	4.00	0.0000	124.00	No Ice	8.13	6.80	0.11
(Verizon Existing)			0.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
CBRS Antenna	C	From Face	4.00	0.0000	124.00	No Ice	1.72	1.17	0.03
(Verizon Existing)			4.00			1/2" Ice	1.93	1.44	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	2.14	1.71	0.07
DB844G65ZAXY	C	From Face	4.00	0.0000	124.00	No Ice	4.34	3.61	0.02
(Verizon Existing)			6.00			1/2" Ice	4.66	3.92	0.05
			0.00			1" Ice	4.98	4.23	0.09
B2/B66A RRH	A	From Face	4.00	0.0000	124.00	No Ice	2.54	1.61	0.06
(Verizon Existing)			4.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B2/B66A RRH	B	From Face	4.00	0.0000	124.00	No Ice	2.54	1.61	0.06
(Verizon Existing)			4.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B2/B66A RRH	C	From Face	4.00	0.0000	124.00	No Ice	2.54	1.61	0.06
(Verizon Existing)			4.00			1/2" Ice	2.75	1.79	0.08
			0.00			1" Ice	2.97	1.98	0.10
B5/B15 RRH -BRO4C	A	From Face	4.00	0.0000	124.00	No Ice	1.87	1.02	0.07
(Verizon Existing)			4.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
B5/B15 RRH -BRO4C	B	From Face	4.00	0.0000	124.00	No Ice	1.87	1.02	0.07
(Verizon Existing)			4.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
B5/B15 RRH -BRO4C	C	From Face	4.00	0.0000	124.00	No Ice	1.87	1.02	0.07
(Verizon Existing)			4.00			1/2" Ice	2.03	1.15	0.09
			0.00			1" Ice	2.21	1.29	0.11
RRU	A	From Face	4.00	0.0000	124.00	No Ice	1.80	0.78	0.03
(Verizon Existing)			4.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
RRU	B	From Face	4.00	0.0000	124.00	No Ice	1.80	0.78	0.03
(Verizon Existing)			4.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
RRU	C	From Face	4.00	0.0000	124.00	No Ice	1.80	0.78	0.03
(Verizon Existing)			4.00			1/2" Ice	2.00	0.92	0.04
			0.00			1" Ice	2.20	1.06	0.06
RC2DC-3315-PF-48	A	From Face	1.00	0.0000	124.00	No Ice	3.01	1.96	0.03
(Verizon Existing)			1.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
RC2DC-3315-PF-48	B	From Face	1.00	0.0000	124.00	No Ice	3.01	1.96	0.03
(Verizon Existing)			1.00			1/2" Ice	3.23	2.15	0.05
			0.00			1" Ice	3.46	2.35	0.08
Low Profile Platform	C	None		0.0000	124.00	No Ice	15.70	15.70	1.30
(Verizon Existing)						1/2" Ice	20.10	20.10	1.76
						1" Ice	24.50	24.50	2.23
531-70HD	C	From Face	3.00	0.0000	114.00	No Ice	6.00	6.00	0.04
(Eversource Existing)			-6.00			1/2" Ice	6.90	6.90	0.05
			0.00			1" Ice	7.80	7.80	0.06
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			2.50			1" Ice	1.56	1.56	0.03
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			-2.50			1" Ice	1.56	1.56	0.03
ANT150F2	C	From Face	3.00	0.0000	114.00	No Ice	1.30	1.30	0.02
(Eversource Existing)			-3.00			1/2" Ice	1.60	1.60	0.02
			2.50			1" Ice	1.90	1.90	0.03
Tower Top Amplifier	C	From Face	3.00	0.0000	114.00	No Ice	2.67	1.03	0.04
(Eversource Existing)			5.00			1/2" Ice	2.87	1.17	0.06
			0.00			1" Ice	3.08	1.32	0.08
Low Profile Platform	C	None		0.0000	114.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	24.50	24.50	2.23
GPS	A	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
GPS	B	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
GPS	C	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH	A	Paraboloid	From	1.00	Worst		160.00	4.00	No Ice	12.56	0.17
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	13.09	0.24
				0.00					1" Ice	13.62	0.30
4 FT DISH	B	Paraboloid	From	1.00	Worst		160.00	4.00	No Ice	12.56	0.17
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	13.09	0.24
				0.00					1" Ice	13.62	0.30
2 FT DISH	C	Paraboloid	From	1.00	Worst		160.00	2.00	No Ice	3.14	0.03
(Town Existing)		w/Shroud (HP)	Leg	0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.67	0.06
A-Ant-23G-2-C	A	Paraboloid	From	3.10	Worst		154.00	2.17	No Ice	3.72	0.03
(Clearwire Existing)		w/Radome	Face	-2.52					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
A-Ant-23G-2-C	C	Paraboloid	From	3.80	Worst		154.00	2.17	No Ice	3.72	0.03
(Clearwire Existing)		w/Radome	Face	-1.24					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07

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	147.50	1.374	33	137.953	A	0.000	137.953	137.953	100.00	0.000	0.000
164.00-131.50					B	0.000	137.953		100.00	7.425	0.000
					C	0.000	137.953		100.00	0.000	0.000
L2	125.34	1.327	32	56.545	A	0.000	56.545	56.545	100.00	0.000	0.000
131.50-119.29					B	0.000	56.545		100.00	7.253	0.000

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
					C	0.000	56.545		100.00	0.000	0.000
L3	98.81	1.262	30	202.275	A	0.000	202.275	202.275	100.00	0.000	0.000
119.29-78.79					B	0.000	202.275		100.00	24.057	0.000
					C	0.000	202.275		100.00	0.000	0.000
L4 78.79-39.88	59.30	1.134	27	216.653	A	0.000	216.653	216.653	100.00	0.000	0.000
					B	0.000	216.653		100.00	26.982	0.000
					C	0.000	216.653		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	22	234.431	A	0.000	234.431	234.431	100.00	0.000	0.000
					B	0.000	234.431		100.00	31.015	0.000
					C	0.000	234.431		100.00	0.000	0.000

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	147.50	1.374	8	2.1779	149.749	A	0.000	149.749	149.749	100.00	0.000	0.000
164.00-131.50						B	0.000	149.749		100.00	16.087	0.000
						C	0.000	149.749		100.00	0.000	0.000
L2	125.34	1.327	8	2.1427	60.905	A	0.000	60.905	60.905	100.00	0.000	0.000
131.50-119.29						B	0.000	60.905		100.00	15.607	0.000
						C	0.000	60.905		100.00	0.000	0.000
L3 119.29-78.79	98.81	1.262	8	2.0923	216.738	A	0.000	216.738	216.738	100.00	0.000	0.000
						B	0.000	216.738		100.00	51.766	0.000
						C	0.000	216.738		100.00	0.000	0.000
L4 78.79-39.88	59.30	1.134	7	1.9882	230.222	A	0.000	230.222	230.222	100.00	0.000	0.000
						B	0.000	230.222		100.00	60.159	0.000
						C	0.000	230.222		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	6	1.7926	247.148	A	0.000	247.148	247.148	100.00	0.000	0.000
						B	0.000	247.148		100.00	72.449	0.000
						C	0.000	247.148		100.00	0.000	0.000

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	147.50	1.374	11	137.953	A	0.000	137.953	137.953	100.00	0.000	0.000
164.00-131.50					B	0.000	137.953		100.00	7.425	0.000
					C	0.000	137.953		100.00	0.000	0.000
L2	125.34	1.327	10	56.545	A	0.000	56.545	56.545	100.00	0.000	0.000
131.50-119.29					B	0.000	56.545		100.00	7.253	0.000
					C	0.000	56.545		100.00	0.000	0.000
L3	98.81	1.262	10	202.275	A	0.000	202.275	202.275	100.00	0.000	0.000
119.29-78.79					B	0.000	202.275		100.00	24.057	0.000
					C	0.000	202.275		100.00	0.000	0.000

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
L4 78.79-39.88	59.30	1.134	9	216.653	A	0.000	216.653	216.653	100.00	0.000	0.000
					B	0.000	216.653		100.00	26.982	0.000
					C	0.000	216.653		100.00	0.000	0.000
L5 39.88-1.50	21.06	0.912	7	234.431	A	0.000	234.431	234.431	100.00	0.000	0.000
					B	0.000	234.431		100.00	31.015	0.000
					C	0.000	234.431		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	33	1	1	137.953	3.28	100.80	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	32	1	1	56.545	1.30	106.31	C
131.50-119.29			B	1	0.65		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	30	1	1	202.275	4.41	108.91	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	27	1	1	216.653	4.23	108.81	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	22	1	1	234.431	3.71	96.67	C
			B	1	0.65		1	1	234.431			
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	1385.54 kip-ft	16.93		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	33	1	1	137.953	3.28	100.80	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	32	1	1	56.545	1.30	106.31	C
131.50-119.29			B	1	0.65		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	30	1	1	202.275	4.41	108.91	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	27	1	1	216.653	4.23	108.81	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	22	1	1	234.431	3.71	96.67	C
			B	1	0.65		1	1	234.431			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	1385.54 kip-ft	16.93		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	33	1	1	137.953	3.28	100.80	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	32	1	1	56.545	1.32	108.50	B
131.50-119.29			B	1	0.663		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	30	1	1	202.275	4.41	108.91	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	27	1	1	216.653	4.23	108.81	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	22	1	1	234.431	3.71	96.67	C
			B	1	0.65		1	1	234.431			
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	1388.86 kip-ft	16.96		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.09	10.05	A	1	1.2	8	1	1	149.749	1.65	50.77	C
164.00-131.50			B	1	1.2		1	1	149.749			
			C	1	1.2		1	1	149.749			
L2	0.96	4.53	A	1	1.2	8	1	1	60.905	0.65	53.13	C
131.50-119.29			B	1	1.2		1	1	60.905			
			C	1	1.2		1	1	60.905			
L3	3.71	19.16	A	1	1.2	8	1	1	216.738	2.19	54.15	C
119.29-78.79			B	1	1.2		1	1	216.738			
			C	1	1.2		1	1	216.738			
L4	3.72	25.03	A	1	1.2	7	1	1	230.222	2.09	53.65	C
78.79-39.88			B	1	1.2		1	1	230.222			
			C	1	1.2		1	1	230.222			
L5 39.88-1.50	3.39	26.78	A	1	1.2	6	1	1	247.148	1.82	47.29	C
			B	1	1.2		1	1	247.148			
			C	1	1.2		1	1	247.148			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
Sum Weight:	12.87	85.55						OTM	690.84 kip-ft	8.39		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.09	10.05	A	1	1.2	8	1	1	149.749	1.65	50.77	C
164.00-131.50			B	1	1.2		1	1	149.749			
			C	1	1.2		1	1	149.749			
L2	0.96	4.53	A	1	1.2	8	1	1	60.905	0.65	53.13	C
131.50-119.29			B	1	1.2		1	1	60.905			
			C	1	1.2		1	1	60.905			
L3	3.71	19.16	A	1	1.2	8	1	1	216.738	2.19	54.15	C
119.29-78.79			B	1	1.2		1	1	216.738			
			C	1	1.2		1	1	216.738			
L4	3.72	25.03	A	1	1.2	7	1	1	230.222	2.09	53.65	C
78.79-39.88			B	1	1.2		1	1	230.222			
			C	1	1.2		1	1	230.222			
L5 39.88-1.50	3.39	26.78	A	1	1.2	6	1	1	247.148	1.82	47.29	C
			B	1	1.2		1	1	247.148			
			C	1	1.2		1	1	247.148			
Sum Weight:	12.87	85.55						OTM	690.84 kip-ft	8.39		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	1.09	10.05	A	1	1.2	8	1	1	149.749	1.65	50.77	C
164.00-131.50			B	1	1.2		1	1	149.749			
			C	1	1.2		1	1	149.749			
L2	0.96	4.53	A	1	1.2	8	1	1	60.905	0.65	53.13	C
131.50-119.29			B	1	1.2		1	1	60.905			
			C	1	1.2		1	1	60.905			
L3	3.71	19.16	A	1	1.2	8	1	1	216.738	2.19	54.15	C
119.29-78.79			B	1	1.2		1	1	216.738			
			C	1	1.2		1	1	216.738			
L4	3.72	25.03	A	1	1.2	7	1	1	230.222	2.09	53.65	C
78.79-39.88			B	1	1.2		1	1	230.222			
			C	1	1.2		1	1	230.222			
L5 39.88-1.50	3.39	26.78	A	1	1.2	6	1	1	247.148	1.82	47.29	C
			B	1	1.2		1	1	247.148			
			C	1	1.2		1	1	247.148			
Sum Weight:	12.87	85.55						OTM	690.84	8.39		

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

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	11	1	1	137.953	1.06	32.64	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	10	1	1	56.545	0.42	34.43	C
131.50-119.29			B	1	0.65		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	10	1	1	202.275	1.43	35.27	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	9	1	1	216.653	1.37	35.24	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	7	1	1	234.431	1.20	31.31	C
			B	1	0.65		1	1	234.431			
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	448.70 kip-ft	5.48		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	11	1	1	137.953	1.06	32.64	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	10	1	1	56.545	0.42	34.43	C
131.50-119.29			B	1	0.65		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	10	1	1	202.275	1.43	35.27	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	9	1	1	216.653	1.37	35.24	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	7	1	1	234.431	1.20	31.31	C
			B	1	0.65		1	1	234.431			
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	448.70 kip-ft	5.48		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.86	5.47	A	1	0.65	11	1	1	137.953	1.06	32.64	C
164.00-131.50			B	1	0.65		1	1	137.953			
			C	1	0.65		1	1	137.953			
L2	0.74	2.69	A	1	0.65	10	1	1	56.545	0.43	35.14	B
131.50-119.29			B	1	0.663		1	1	56.545			
			C	1	0.65		1	1	56.545			
L3	2.98	12.76	A	1	0.65	10	1	1	202.275	1.43	35.27	C
119.29-78.79			B	1	0.65		1	1	202.275			
			C	1	0.65		1	1	202.275			
L4	2.90	18.55	A	1	0.65	9	1	1	216.653	1.37	35.24	C
78.79-39.88			B	1	0.65		1	1	216.653			
			C	1	0.65		1	1	216.653			
L5 39.88-1.50	2.46	20.49	A	1	0.65	7	1	1	234.431	1.20	31.31	C
			B	1	0.65		1	1	234.431			
			C	1	0.65		1	1	234.431			
Sum Weight:	9.94	59.96						OTM	449.77 kip-ft	5.49		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	59.96					
Bracing Weight	0.00					
Total Member Self-Weight	59.96			-1.11	-1.70	
Total Weight	87.59			-1.11	-1.70	
Wind 0 deg - No Ice		0.03	-34.76	-3883.44	-5.94	-1.12
Wind 30 deg - No Ice		17.42	-30.12	-3365.43	-1949.03	0.21
Wind 60 deg - No Ice		30.14	-17.40	-1945.95	-3370.33	1.48
Wind 90 deg - No Ice		34.78	-0.03	-5.35	-3889.01	2.35
Wind 120 deg - No Ice		30.11	17.36	1936.38	-3366.09	2.60
Wind 150 deg - No Ice		17.38	30.11	3361.84	-1943.34	2.15
Wind 180 deg - No Ice		-0.03	34.76	3881.21	2.55	1.12
Wind 210 deg - No Ice		-17.42	30.12	3363.20	1945.63	-0.21
Wind 240 deg - No Ice		-30.14	17.40	1943.72	3366.94	-1.48
Wind 270 deg - No Ice		-34.78	0.03	3.13	3885.62	-2.35
Wind 300 deg - No Ice		-30.11	-17.36	-1938.60	3362.70	-2.60
Wind 330 deg - No Ice		-17.38	-30.11	-3364.06	1939.95	-2.15
Member Ice	25.59					
Total Weight Ice	148.52			-3.95	-5.28	
Wind 0 deg - Ice		0.01	-15.46	-1687.48	-6.40	-0.79
Wind 30 deg - Ice		7.74	-13.39	-1462.49	-848.69	-0.16
Wind 60 deg - Ice		13.40	-7.74	-846.68	-1464.99	0.52
Wind 90 deg - Ice		15.47	-0.01	-5.06	-1690.16	1.06

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 120 deg - Ice		13.39	7.72	836.86	-1463.87	1.31
Wind 150 deg - Ice		7.73	13.38	1453.48	-846.76	1.21
Wind 180 deg - Ice		-0.01	15.46	1679.59	-4.17	0.79
Wind 210 deg - Ice		-7.74	13.39	1454.60	838.12	0.16
Wind 240 deg - Ice		-13.40	7.74	838.79	1454.42	-0.52
Wind 270 deg - Ice		-15.47	0.01	-2.83	1679.60	-1.06
Wind 300 deg - Ice		-13.39	-7.72	-844.75	1453.31	-1.31
Wind 330 deg - Ice		-7.73	-13.38	-1461.37	836.19	-1.21
Total Weight	87.59			-1.11	-1.70	
Wind 0 deg - Service		0.01	-11.26	-1257.21	-1.05	-0.36
Wind 30 deg - Service		5.64	-9.75	-1089.45	-630.30	0.07
Wind 60 deg - Service		9.76	-5.64	-629.77	-1090.58	0.48
Wind 90 deg - Service		11.26	-0.01	-1.32	-1258.55	0.76
Wind 120 deg - Service		9.75	5.62	627.50	-1089.21	0.84
Wind 150 deg - Service		5.63	9.75	1089.12	-628.46	0.69
Wind 180 deg - Service		-0.01	11.26	1257.32	1.70	0.36
Wind 210 deg - Service		-5.64	9.75	1089.56	630.96	-0.07
Wind 240 deg - Service		-9.76	5.64	629.88	1091.23	-0.48
Wind 270 deg - Service		-11.26	0.01	1.43	1259.21	-0.76
Wind 300 deg - Service		-9.75	-5.62	-627.39	1089.86	-0.84
Wind 330 deg - Service		-5.63	-9.75	-1089.01	629.11	-0.69

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	164 - 131.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.67	2.56	0.77
			Max. Mx	20	-22.99	456.59	-0.22
			Max. My	2	-22.99	-0.67	454.94
			Max. Vy	8	28.07	-456.06	1.51
			Max. Vx	2	-27.99	-0.67	454.94
			Max. Torque	2			3.97
L2	131.5 - 119.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.79	2.25	0.95
			Max. Mx	20	-25.05	634.18	-0.47
			Max. My	2	-25.06	-1.04	632.16
			Max. Vy	8	29.16	-633.82	1.84
			Max. Vx	2	-29.08	-1.04	632.16
			Max. Torque	24			2.97
L3	119.29 - 78.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-93.92	0.79	0.47
			Max. Mx	8	-47.17	-2096.81	3.39
			Max. My	2	-47.17	-3.40	2091.84
			Max. Vy	8	42.36	-2096.81	3.39
			Max. Vx	2	-42.32	-3.40	2091.84
			Max. Torque	10			-4.18
L4	78.79 - 39.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-126.46	-1.75	1.93
			Max. Mx	8	-71.48	-3839.38	5.55
			Max. My	2	-71.48	-5.85	3832.67
			Max. Vy	8	49.08	-3839.38	5.55
			Max. Vx	2	-49.04	-5.85	3832.67
			Max. Torque	10			-4.17
L5	39.88 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-169.90	-5.62	4.17
			Max. Mx	8	-105.09	-6347.08	8.30
			Max. My	2	-105.09	-9.01	6338.19
			Max. Vy	8	55.69	-6347.08	8.30

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-55.65	-9.01	6338.19
			Max. Torque	10			-4.17

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	169.90	0.00	0.00
	Max. H_x	20	105.11	55.65	-0.05
	Max. H_z	2	105.11	-0.05	55.62
	Max. M_x	2	6338.19	-0.05	55.62
	Max. M_z	8	6347.08	-55.65	0.05
	Max. Torsion	22	4.17	48.17	27.77
	Min. Vert	23	78.83	48.17	27.77
	Min. H_x	8	105.11	-55.65	0.05
	Min. H_z	14	105.11	0.05	-55.62
	Min. M_x	14	-6335.47	0.05	-55.62
	Min. M_z	20	-6342.94	55.65	-0.05
	Min. Torsion	10	-4.17	-48.17	-27.77

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	87.59	0.00	0.00	-1.11	-1.70	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	105.11	0.05	-55.62	-6338.19	-9.01	-1.82
0.9 Dead+1.6 Wind 0 deg - No Ice	78.83	0.05	-55.62	-6305.73	-8.45	-1.81
1.2 Dead+1.6 Wind 30 deg - No Ice	105.11	27.87	-48.19	-5492.68	-3180.58	0.31
0.9 Dead+1.6 Wind 30 deg - No Ice	78.83	27.87	-48.19	-5464.51	-3163.94	0.31
1.2 Dead+1.6 Wind 60 deg - No Ice	105.11	48.22	-27.85	-3175.78	-5500.48	2.35
0.9 Dead+1.6 Wind 60 deg - No Ice	78.83	48.22	-27.85	-3159.35	-5472.08	2.36
1.2 Dead+1.6 Wind 90 deg - No Ice	105.11	55.65	-0.05	-8.30	-6347.08	3.77
0.9 Dead+1.6 Wind 90 deg - No Ice	78.83	55.65	-0.05	-7.92	-6314.39	3.77
1.2 Dead+1.6 Wind 120 deg - No Ice	105.11	48.17	27.77	3161.04	-5493.55	4.17
0.9 Dead+1.6 Wind 120 deg - No Ice	78.83	48.17	27.77	3145.36	-5465.19	4.17
1.2 Dead+1.6 Wind 150 deg - No Ice	105.11	27.81	48.18	5487.72	-3171.29	3.46
0.9 Dead+1.6 Wind 150 deg - No Ice	78.83	27.81	48.18	5460.25	-3154.70	3.45
1.2 Dead+1.6 Wind 180 deg - No Ice	105.11	-0.05	55.62	6335.47	4.86	1.82

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 180 deg - No Ice	78.83	-0.05	55.62	6303.70	5.35	1.81
1.2 Dead+1.6 Wind 210 deg - No Ice	105.11	-27.87	48.19	5489.96	3176.44	-0.31
0.9 Dead+1.6 Wind 210 deg - No Ice	78.83	-27.87	48.19	5462.47	3160.85	-0.32
1.2 Dead+1.6 Wind 240 deg - No Ice	105.11	-48.22	27.85	3173.05	5496.34	-2.35
0.9 Dead+1.6 Wind 240 deg - No Ice	78.83	-48.22	27.85	3157.31	5468.99	-2.35
1.2 Dead+1.6 Wind 270 deg - No Ice	105.11	-55.65	0.05	5.57	6342.94	-3.76
0.9 Dead+1.6 Wind 270 deg - No Ice	78.83	-55.65	0.05	5.88	6311.30	-3.76
1.2 Dead+1.6 Wind 300 deg - No Ice	105.11	-48.17	-27.77	-3163.77	5489.40	-4.17
0.9 Dead+1.6 Wind 300 deg - No Ice	78.83	-48.17	-27.77	-3147.40	5462.09	-4.17
1.2 Dead+1.6 Wind 330 deg - No Ice	105.11	-27.81	-48.18	-5490.45	3167.14	-3.46
0.9 Dead+1.6 Wind 330 deg - No Ice	78.83	-27.81	-48.18	-5462.28	3151.60	-3.45
1.2 Dead+1.0 Ice+1.0 Temp	169.90	0.00	0.00	-4.17	-5.62	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	169.90	0.01	-15.46	-1754.50	-6.89	-0.83
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	169.90	7.74	-13.39	-1520.60	-882.54	-0.19
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	169.90	13.40	-7.74	-880.41	-1523.25	0.51
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	169.90	15.47	-0.01	-5.47	-1757.34	1.07
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	169.90	13.39	7.72	869.78	-1522.08	1.34
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	169.90	7.73	13.38	1510.82	-880.52	1.25
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	169.90	-0.01	15.46	1745.89	-4.56	0.83
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	169.90	-7.74	13.39	1511.99	871.08	0.19
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	169.90	-13.40	7.74	871.80	1511.79	-0.51
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	169.90	-15.47	0.01	-3.14	1745.88	-1.07
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	169.90	-13.39	-7.72	-878.40	1510.63	-1.34
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	169.90	-7.73	-13.38	-1519.44	869.07	-1.26
Dead+Wind 0 deg - Service	87.59	0.01	-11.26	-1279.59	-3.12	-0.37
Dead+Wind 30 deg - Service	87.59	5.64	-9.75	-1109.01	-642.99	0.06
Dead+Wind 60 deg - Service	87.59	9.76	-5.64	-641.57	-1111.03	0.48
Dead+Wind 90 deg - Service	87.59	11.26	-0.01	-2.53	-1281.83	0.76
Dead+Wind 120 deg - Service	87.59	9.75	5.62	636.88	-1109.63	0.84
Dead+Wind 150 deg - Service	87.59	5.63	9.75	1106.29	-641.11	0.70
Dead+Wind 180 deg - Service	87.59	-0.01	11.26	1277.33	-0.32	0.37
Dead+Wind 210 deg - Service	87.59	-5.64	9.75	1106.74	639.55	-0.06
Dead+Wind 240 deg - Service	87.59	-9.76	5.64	639.31	1107.58	-0.48
Dead+Wind 270 deg - Service	87.59	-11.26	0.01	0.27	1278.39	-0.76
Dead+Wind 300 deg - Service	87.59	-9.75	-5.62	-639.15	1106.19	-0.84
Dead+Wind 330 deg - Service	87.59	-5.63	-9.75	-1108.56	637.67	-0.70

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-87.59	0.00	0.00	87.59	0.00	0.000%
2	0.05	-105.11	-55.62	-0.05	105.11	55.62	0.000%
3	0.05	-78.83	-55.62	-0.05	78.83	55.62	0.000%
4	27.87	-105.11	-48.19	-27.87	105.11	48.19	0.000%
5	27.87	-78.83	-48.19	-27.87	78.83	48.19	0.000%
6	48.22	-105.11	-27.85	-48.22	105.11	27.85	0.000%
7	48.22	-78.83	-27.85	-48.22	78.83	27.85	0.000%
8	55.65	-105.11	-0.05	-55.65	105.11	0.05	0.000%
9	55.65	-78.83	-0.05	-55.65	78.83	0.05	0.000%
10	48.17	-105.11	27.77	-48.17	105.11	-27.77	0.000%
11	48.17	-78.83	27.77	-48.17	78.83	-27.77	0.000%
12	27.81	-105.11	48.18	-27.81	105.11	-48.18	0.000%
13	27.81	-78.83	48.18	-27.81	78.83	-48.18	0.000%
14	-0.05	-105.11	55.62	0.05	105.11	-55.62	0.000%
15	-0.05	-78.83	55.62	0.05	78.83	-55.62	0.000%
16	-27.87	-105.11	48.19	27.87	105.11	-48.19	0.000%
17	-27.87	-78.83	48.19	27.87	78.83	-48.19	0.000%
18	-48.22	-105.11	27.85	48.22	105.11	-27.85	0.000%
19	-48.22	-78.83	27.85	48.22	78.83	-27.85	0.000%
20	-55.65	-105.11	0.05	55.65	105.11	-0.05	0.000%
21	-55.65	-78.83	0.05	55.65	78.83	-0.05	0.000%
22	-48.17	-105.11	-27.77	48.17	105.11	27.77	0.000%
23	-48.17	-78.83	-27.77	48.17	78.83	27.77	0.000%
24	-27.81	-105.11	-48.18	27.81	105.11	48.18	0.000%
25	-27.81	-78.83	-48.18	27.81	78.83	48.18	0.000%
26	0.00	-169.90	0.00	0.00	169.90	0.00	0.000%
27	0.01	-169.90	-15.46	-0.01	169.90	15.46	0.000%
28	7.74	-169.90	-13.39	-7.74	169.90	13.39	0.000%
29	13.40	-169.90	-7.74	-13.40	169.90	7.74	0.000%
30	15.47	-169.90	-0.01	-15.47	169.90	0.01	0.000%
31	13.39	-169.90	7.72	-13.39	169.90	-7.72	0.000%
32	7.73	-169.90	13.38	-7.73	169.90	-13.38	0.000%
33	-0.01	-169.90	15.46	0.01	169.90	-15.46	0.000%
34	-7.74	-169.90	13.39	7.74	169.90	-13.39	0.000%
35	-13.40	-169.90	7.74	13.40	169.90	-7.74	0.000%
36	-15.47	-169.90	0.01	15.47	169.90	-0.01	0.000%
37	-13.39	-169.90	-7.72	13.39	169.90	7.72	0.000%
38	-7.73	-169.90	-13.38	7.73	169.90	13.38	0.000%
39	0.01	-87.59	-11.26	-0.01	87.59	11.26	0.000%
40	5.64	-87.59	-9.75	-5.64	87.59	9.75	0.000%
41	9.76	-87.59	-5.64	-9.76	87.59	5.64	0.000%
42	11.26	-87.59	-0.01	-11.26	87.59	0.01	0.000%
43	9.75	-87.59	5.62	-9.75	87.59	-5.62	0.000%
44	5.63	-87.59	9.75	-5.63	87.59	-9.75	0.000%
45	-0.01	-87.59	11.26	0.01	87.59	-11.26	0.000%
46	-5.64	-87.59	9.75	5.64	87.59	-9.75	0.000%
47	-9.76	-87.59	5.64	9.76	87.59	-5.64	0.000%
48	-11.26	-87.59	0.01	11.26	87.59	-0.01	0.000%
49	-9.75	-87.59	-5.62	9.75	87.59	5.62	0.000%
50	-5.63	-87.59	-9.75	5.63	87.59	9.75	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	0.00015541
3	Yes	4	0.00000001	0.00009744
4	Yes	5	0.00000001	0.00003800
5	Yes	5	0.00000001	0.00001842
6	Yes	5	0.00000001	0.00003694
7	Yes	5	0.00000001	0.00001787
8	Yes	4	0.00000001	0.00021832
9	Yes	4	0.00000001	0.00014193
10	Yes	5	0.00000001	0.00004103
11	Yes	5	0.00000001	0.00001997
12	Yes	5	0.00000001	0.00003571
13	Yes	5	0.00000001	0.00001726
14	Yes	4	0.00000001	0.00016244
15	Yes	4	0.00000001	0.00010242
16	Yes	5	0.00000001	0.00003819
17	Yes	5	0.00000001	0.00001851
18	Yes	5	0.00000001	0.00003946
19	Yes	5	0.00000001	0.00001917
20	Yes	4	0.00000001	0.00022620
21	Yes	4	0.00000001	0.00014733
22	Yes	5	0.00000001	0.00003541
23	Yes	5	0.00000001	0.00001712
24	Yes	5	0.00000001	0.00004068
25	Yes	5	0.00000001	0.00001979
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00006662
28	Yes	5	0.00000001	0.00007006
29	Yes	5	0.00000001	0.00007008
30	Yes	5	0.00000001	0.00006663
31	Yes	5	0.00000001	0.00006995
32	Yes	5	0.00000001	0.00006969
33	Yes	5	0.00000001	0.00006636
34	Yes	5	0.00000001	0.00006976
35	Yes	5	0.00000001	0.00006981
36	Yes	5	0.00000001	0.00006649
37	Yes	5	0.00000001	0.00006983
38	Yes	5	0.00000001	0.00007001
39	Yes	4	0.00000001	0.00001549
40	Yes	4	0.00000001	0.00002579
41	Yes	4	0.00000001	0.00002507
42	Yes	4	0.00000001	0.00001683
43	Yes	4	0.00000001	0.00003009
44	Yes	4	0.00000001	0.00002497
45	Yes	4	0.00000001	0.00001549
46	Yes	4	0.00000001	0.00002587
47	Yes	4	0.00000001	0.00002738
48	Yes	4	0.00000001	0.00001683
49	Yes	4	0.00000001	0.00002504
50	Yes	4	0.00000001	0.00002948

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	7.859	41	0.3647	0.0010
L2	131.5 - 119.29	5.415	41	0.3460	0.0007
L3	125.29 - 78.79	4.970	41	0.3377	0.0006
L4	87.21 - 39.88	2.547	41	0.2557	0.0003
L5	49.13 - 1.5	0.857	41	0.1556	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	41	7.859	0.3647	0.0010	308477
160.00	4 FT DISH	41	7.553	0.3635	0.0010	308477
156.00	A-Ant-23G-2-C	41	7.247	0.3623	0.0009	192798
154.00	LLPX310R	41	7.095	0.3616	0.0009	154238
151.50	Remote Radio Head FD R6 RRH	41	6.905	0.3607	0.0009	123390
144.00	AIR6449	41	6.338	0.3569	0.0008	77119
138.00	DC6-48-60-18-8F Surge Arrestor	41	5.891	0.3525	0.0007	59322
134.00	7770.00	41	5.597	0.3488	0.0007	51352
124.00	DB844G65ZAXY	41	4.879	0.3357	0.0006	37332
114.00	531-70HD	41	4.193	0.3178	0.0005	32866
51.50	GPS	41	0.933	0.1625	0.0002	15143

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	38.927	6	1.8068	0.0051
L2	131.5 - 119.29	26.822	6	1.7143	0.0033
L3	125.29 - 78.79	24.618	6	1.6731	0.0031
L4	87.21 - 39.88	12.612	6	1.2669	0.0017
L5	49.13 - 1.5	4.246	6	0.7709	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	6	38.927	1.8068	0.0051	62772
160.00	4 FT DISH	6	37.411	1.8012	0.0048	62772
156.00	A-Ant-23G-2-C	6	35.897	1.7951	0.0046	39232
154.00	LLPX310R	6	35.141	1.7917	0.0044	31386
151.50	Remote Radio Head FD R6 RRH	6	34.199	1.7869	0.0042	25108
144.00	AIR6449	6	31.394	1.7682	0.0038	15692
138.00	DC6-48-60-18-8F Surge Arrestor	6	29.180	1.7466	0.0036	12070
134.00	7770.00	6	27.723	1.7280	0.0034	10446
124.00	DB844G65ZAXY	6	24.168	1.6633	0.0031	7549
114.00	531-70HD	6	20.769	1.5745	0.0027	6643

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
51.50	GPS	6	4.621	0.8048	0.0009	3058

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	32.50	162.50	103.4	52.6760	-22.99	1112.38	0.021
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	12.21	162.50	100.9	64.7894	-25.05	1437.35	0.017
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	46.50	162.50	90.2	84.5934	-47.17	2338.92	0.020
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	47.33	162.50	81.6	120.1620	-71.48	3951.81	0.018
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	47.63	162.50	72.8	134.6840	-105.09	5096.65	0.021

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	456.65	3531.85	0.129	0.00	3531.85	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	634.56	4783.28	0.133	0.00	4783.28	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	2098.27	7104.26	0.295	0.00	7104.26	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	3842.13	11742.75	0.327	0.00	11742.75	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	6351.44	14202.67	0.447	0.00	14202.67	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	28.09	1613.88	0.017	0.58	7078.63	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	29.18	2134.62	0.014	0.58	9588.25	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	42.39	2833.69	0.015	2.36	14241.33	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	49.11	4244.46	0.012	2.35	23543.83	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	55.72	4576.00	0.012	2.35	28472.08	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

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	164 - 131.5 (1)	0.021	0.129	0.000	0.017	0.000	0.150 ✔	1.000	4.8.2 ✔
L2	131.5 - 119.29 (2)	0.017	0.133	0.000	0.014	0.000	0.150 ✔	1.000	4.8.2 ✔
L3	119.29 - 78.79 (3)	0.020	0.295	0.000	0.015	0.000	0.316 ✔	1.000	4.8.2 ✔
L4	78.79 - 39.88 (4)	0.018	0.327	0.000	0.012	0.000	0.345 ✔	1.000	4.8.2 ✔
L5	39.88 - 1.5 (5)	0.021	0.447	0.000	0.012	0.000	0.468 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-22.99	1112.38	15.0	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-25.05	1437.35	15.0	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-47.17	2338.92	31.6	Pass
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-71.48	3951.81	34.5	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-105.09	5096.65	46.8	Pass
							Summary	
						Pole (L5)	46.8	Pass
						RATING =	**46.8**	**Pass**

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Subject:	Flange Bolts and Flangeplate Analysis
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 7/13/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.46

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 457·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 28.1·kips	(Input From tnxTower)
Axial Force =	Axial := 52.7·kips	(Input From tnxTower)

Flange Bolt Data:

Use AST MA325

Number of Flange Bolts =	N := 12	(User Input)
Diameter of Bolt Circle =	D_{bc} := 58·in	(User Input)
Bolt Minimum Tensile Strength =	F_{ub} := 120·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)
Threads per Inch =	n := 8	(User Input)

Flange Plate Data:

Use AST MA36

Plate Yield Strength =	Fy_{bp} := 36·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.0·in	(User Input)
Flange Plate Diameter =	D_{bp} := 61.0·in	(User Input)
Outer Pole Diameter =	D_{pole} := 53.42·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 29 \cdot in$

Distance to Bolts = $i := 1 .. N$

$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$

$d_1 = 14.50 \cdot in$ $d_7 = -14.50 \cdot in$

$d_2 = 25.11 \cdot in$ $d_8 = -25.11 \cdot in$

$d_3 = 29.00 \cdot in$ $d_9 = -29.00 \cdot in$

$d_4 = 25.11 \cdot in$ $d_{10} = -25.11 \cdot in$

$d_5 = 14.50 \cdot in$ $d_{11} = -14.50 \cdot in$

$d_6 = 0.00 \cdot in$ $d_{12} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 26.71 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.29 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 23.6 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 5.046 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 27.1 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 2.3 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := \left(0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g\right) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 51.17 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := \left(0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g\right) = 31.8 \cdot kips$

Condition2 = $Condition2 := if\left[\left(\frac{V_{Max}}{\Phi R_{nv}}\right)^2 + \left(\frac{T_{Max}}{\Phi R_{nt}}\right)^2 \le 1.00, "OK", "Overstressed"\right]$

Condition2 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 20.2 \cdot kips$ $C_7 = -11.4 \cdot kips$

$C_2 = 31.7 \cdot kips$ $C_8 = -22.9 \cdot kips$

$C_3 = 35.9 \cdot kips$ $C_9 = -27.1 \cdot kips$

$C_4 = 31.7 \cdot kips$ $C_{10} = -22.9 \cdot kips$

$C_5 = 20.2 \cdot kips$ $C_{11} = -11.4 \cdot kips$

$C_6 = 4.4 \cdot kips$ $C_{12} = 4.4 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \, t_{bp}^{\,2}\right)} = 14 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 43.1 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	168-FT Monopole Greenwich, CT
Rev. 0: 7/13/20	Prepafred by: T.J.L. Checked by: C.F.C. Job No. 20074.46

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 6351 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 56 \cdot kips$	(Input From tnxTower)
Axial Force =	$R_u := 105 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 30$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 86 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1$	Table 2-1 Addendum 3

Base Plate Data:

ASTMA572 Grade 60

Plate Yield Strength =	$F_{yf} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 3.0 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 92.0 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 76.0 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.5625 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 96.3 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 1.9 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 38.5$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed" \right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \right] \cdot 100 = 13.8$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \le 1.00, "OK", "Overstressed" \right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 76.25 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le \left(D_{BC} + 6 \cdot t_{TP}\right) \\ \left(D_{BC} + 6 \cdot t_{TP}\right) & \text{otherwise} \end{cases} = 92 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.105$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := \operatorname{asin}\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.432$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := \operatorname{acos}\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.338$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := \min\left(\theta_1, \theta_2, \theta_3\right) = 0.105$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot \left(D_{BC} - D_e\right) = 4.875 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot \sin(\theta) = 8.989 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := \left(D_{oe} - D_e\right) \cdot \sin(\theta) = 1.646 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 10.636 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 1.808 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 60.3 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 0.914 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 30.5 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition4 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 7/13/20	Prepared by: TJL Checked by: C.F.C. Job No. 20074.46

Caisson Foundation:

Input Data:

Shear Force =	$S := 56k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 6351ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 105k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 6651ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 12372ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 9.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 28.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	*USER INPUT*
Number of Rebar =	$n := 33$	*USER INPUT*
Area of Rebar =	$Ar := 1.560in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9 \cdot Mn}{Mu} = 1.7$

Factor of Safety Required = $FS_{reqd} := 1$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

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LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

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This program is licensed to:

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Files Used for Analysis

Path to file locations: J:\Jobs\2007400.WI\46_CTFF001A\05_Structural\Tower Analysis\Backup Documentation\Foundation\
Name of input data file: Greenwich Hospital Caisson Analysis.lpd
Name of output file: Greenwich Hospital Caisson Analysis.lpo
Name of plot output file: Greenwich Hospital Caisson Analysis.lpp
Name of runtime file: Greenwich Hospital Caisson Analysis.lpr

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Time and Date of Analysis

Date: July 13, 2020 Time: 12:47:34

Problem Title

18058.64 - CTFF001A

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and
  soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 336.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	108.00000	6678285.	9160.9000	3600000.
2	336.0000	108.00000	6678285.	9160.9000	3600000.

Please note that because this analysis makes computations of ultimate
moment capacity and pile response using nonlinear bending stiffness
that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 20.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 20.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 72.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 72.000 in
Distance from top of pile to bottom of layer = 132.000 in
p-y subgrade modulus k for top of soil layer = 150.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 150.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 132.000 in
Distance from top of pile to bottom of layer = 360.000 in
p-y subgrade modulus k for top of soil layer = 250.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 250.000 lbs/in**3

(Depth of lowest layer extends 24.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800
2	48.00	0.05800
3	48.00	0.06900
4	72.00	0.06900
5	72.00	0.06900
6	132.00	0.06900
7	132.00	0.07500

8	360.00	0.07500

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	20.00	------	------
2	48.000	0.00000	20.00	------	------
3	48.000	0.00000	30.00	------	------
4	72.000	0.00000	30.00	------	------
5	72.000	0.00000	35.00	------	------
6	132.000	0.00000	35.00	------	------
7	132.000	0.00000	42.00	------	------
8	360.000	0.00000	42.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 56000.000 lbs
Bending moment at pile head = 76212000.000 in-lbs

Axial load at pile head = 105000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head
may rotate under the applied pile-head loading, but is not a free-head
(zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 23000.000 lbs
Bending moment at pile head = 31860000.000 in-lbs
Axial load at pile head = 105000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head
may rotate under the applied pile-head loading, but is not a free-head
(zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 108.0000 in

Material Properties:

Compressive Strength of Concrete	=	3.000 kip/in**2
Yield Stress of Reinforcement	=	60. kip/in**2
Modulus of Elasticity of Reinforcement	=	29000. kip/in**2
Number of Reinforcing Bars	=	33
Area of Single Bar	=	1.56000 in**2
Number of Rows of Reinforcing Bars	=	33
Area of Steel	=	51.480 in**2
Area of Shaft	=	9160.884 in**2
Percentage of Steel Reinforcement	=	0.562 percent
Cover Thickness (edge to bar center)	=	4.000 in

Unfactored Axial Squash Load Capacity = 26317.78 kip

Distribution and Area of Steel Reinforcement

Row	Area of	Distance to

Number	Reinforcement in**2	Centroidal Axis in
1	1.560	49.943
2	1.560	49.491
3	1.560	48.591
4	1.560	47.250
5	1.560	45.482
6	1.560	43.301
7	1.560	40.729
8	1.560	37.787
9	1.560	34.504
10	1.560	30.908
11	1.560	27.032
12	1.560	22.911
13	1.560	18.583
14	1.560	14.087
15	1.560	9.463
16	1.560	4.753
17	1.560	0.000
18	1.560	-4.753
19	1.560	-9.463
20	1.560	-14.087
21	1.560	-18.583
22	1.560	-22.911
23	1.560	-27.032
24	1.560	-30.908
25	1.560	-34.504
26	1.560	-37.787
27	1.560	-40.729
28	1.560	-43.301
29	1.560	-45.482
30	1.560	-47.250
31	1.560	-48.591
32	1.560	-49.491
33	1.560	-49.943

Axial Thrust Force = 105000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11412273.	2.282455E+13	5.000000E-07	0.00003060	61.20000118	94.07059618	828.57884
22709716.	2.270972E+13	0.00000100	0.00005770	57.69642895	175.73805	

```
 1555.55408
   33889425.  2.259295E+13    0.00000150    0.00008483   56.55283910     256.13334
 2283.58496
   44945754.  2.247288E+13    0.00000200    0.00011192   55.96208149     335.03262
 3010.51601
   55887932.  2.235517E+13    0.00000250    0.00013911   55.64593917     412.82732
 3740.22469
   55887932.  1.862931E+13    0.00000300    0.00008777   29.25626940     260.87894
 6497.77749
   55887932.  1.596798E+13    0.00000350    0.00010032   28.66196483     296.83675
 7641.06232
   55887932.  1.397198E+13    0.00000400    0.00011256   28.14087492     331.62450
 8793.08908
   55887932.  1.241954E+13    0.00000450    0.00012482   27.73879784     366.18376
 9944.69627
   55887932.  1.117759E+13    0.00000500    0.00013710   27.42004842     400.51382
11095.88119
   55887932.  1.016144E+13    0.00000550    0.00014939   27.16191584     434.61391
12246.64145
   55887932.  9.314655E+12    0.00000600    0.00016200   26.99999839     469.34939
13388.14613
   55887932.  8.598143E+12    0.00000650    0.00017438   26.82765251     503.14924
14536.31217
   55887932.  7.983990E+12    0.00000700    0.00018666   26.66508812     536.38160
15687.49060
   55887932.  7.451724E+12    0.00000750    0.00019895   26.52633208     569.38637
16838.20509
   55887932.  6.985992E+12    0.00000800    0.00021126   26.40692979     602.16266
17988.45342
   55887932.  6.575051E+12    0.00000850    0.00022358   26.30348235     634.70974
19138.23156
   55887932.  6.209770E+12    0.00000900    0.00023592   26.21334082     667.02673
20287.53682
   55887932.  5.882940E+12    0.00000950    0.00024828   26.13441950     699.11289
21436.36502
   55887932.  5.588793E+12    0.00001000    0.00026065   26.06504792     730.96742
22584.71252
   55887932.  5.322660E+12    0.00001050    0.00027304   26.00386781     762.58931
23732.57749
   55887932.  5.080721E+12    0.00001100    0.00028545   25.94978160     793.97798
24879.95373
   55887932.  4.859820E+12    0.00001150    0.00029787   25.90186554     825.13230
26026.84072
   55887932.  4.657328E+12    0.00001200    0.00031031   25.85936326     856.05154
27173.23329
   55887932.  4.471035E+12    0.00001250    0.00032277   25.82163745     886.73490
28319.12695
   55887932.  4.299072E+12    0.00001300    0.00033525   25.78814417     917.18142
29464.51899
   55887932.  4.139847E+12    0.00001350    0.00034774   25.75841993     947.39011
30609.40676
```

57559887.	4.111420E+12	0.00001400	0.00036025	25.73207527	977.36024
31753.78442					
59470009.	4.101380E+12	0.00001450	0.00037278	25.70876902	1007.09088
32897.64843					
61377927.	4.091862E+12	0.00001500	0.00038532	25.68820184	1036.58094
34040.99682					
63283640.	4.082815E+12	0.00001550	0.00039789	25.67012268	1065.82969
35183.82330					
65187132.	4.074196E+12	0.00001600	0.00041047	25.65430623	1094.83616
36326.12418					
67088384.	4.065963E+12	0.00001650	0.00042307	25.64055294	1123.59931
37467.89651					
68987381.	4.058081E+12	0.00001700	0.00043569	25.62868899	1152.11817
38609.13624					
70884117.	4.050521E+12	0.00001750	0.00044832	25.61856312	1180.39187
39749.83795					
72778571.	4.043254E+12	0.00001800	0.00046098	25.61003691	1208.41935
40889.99829					
74670737.	4.036256E+12	0.00001850	0.00047366	25.60299128	1236.19973
42029.61155					
76560590.	4.029505E+12	0.00001900	0.00048635	25.59731358	1263.73184
43168.67541					
78448126.	4.022981E+12	0.00001950	0.00049906	25.59291047	1291.01484
44307.18315					
82216164.	4.010545E+12	0.00002050	0.00052455	25.58757716	1344.82902
46582.51703					
85974732.	3.998825E+12	0.00002150	0.00055011	25.58638948	1397.63395
48855.57546					
89723689.	3.987720E+12	0.00002250	0.00057575	25.58884853	1449.42084
51126.32327					
93462930.	3.977146E+12	0.00002350	0.00060147	25.59455198	1500.18120
53394.71741					
97192304.	3.967033E+12	0.00002450	0.00062728	25.60315543	1549.90583
55660.72029					
1.009117E+08	3.957321E+12	0.00002550	0.00065317	25.61437565	1598.58559
57924.28907					
1.045980E+08	3.947095E+12	0.00002650	0.00067909	25.62602395	1646.11421
60000.00000					
1.075432E+08	3.910664E+12	0.00002750	0.00070343	25.57916361	1689.52651
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1.099879E+08	3.859226E+12	0.00002850	0.00072667	25.49719423	1729.91716
60000.00000					
1.121215E+08	3.800730E+12	0.00002950	0.00074922	25.39737099	1768.13298
60000.00000					
1.140107E+08	3.738055E+12	0.00003050	0.00077122	25.28580934	1804.48765
60000.00000					
1.158936E+08	3.679162E+12	0.00003150	0.00079380	25.20000011	1840.95386
60000.00000					
1.173461E+08	3.610649E+12	0.00003250	0.00081674	25.13040322	1877.08062
60000.00000					
1.187292E+08	3.544154E+12	0.00003350	0.00083717	24.99025673	1908.31513

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1.200710E+08 3.480319E+12 0.00003450 0.00085753 24.85606152 1938.69181
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1.212255E+08 3.414804E+12 0.00003550 0.00087732 24.71321779 1967.46612
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1.233753E+08 3.290007E+12 0.00003750 0.00091647 24.43932670 2022.33990
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1.243470E+08 3.229792E+12 0.00003850 0.00093576 24.30535358 2048.34512
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1.252784E+08 3.171606E+12 0.00003950 0.00095493 24.17547137 2073.54845
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1.260910E+08 3.113357E+12 0.00004050 0.00097369 24.04171389 2097.54960
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1.269006E+08 3.057846E+12 0.00004150 0.00099248 23.91527563 2120.97731
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1.276962E+08 3.004617E+12 0.00004250 0.00101127 23.79452151 2143.76804
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1.302336E+08 2.800722E+12 0.00004650 0.00108810 23.39999861 2230.60863
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1.309764E+08 2.757398E+12 0.00004750 0.00110693 23.30386072 2250.28456
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1.315069E+08 2.711482E+12 0.00004850 0.00112427 23.18072480 2267.76378
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1.320352E+08 2.667378E+12 0.00004950 0.00114163 23.06321186 2284.75047
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1.325614E+08 2.624978E+12 0.00005050 0.00115903 22.95099682 2301.24197
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1.330366E+08 2.583234E+12 0.00005150 0.00117616 22.83814770 2316.95952
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1.334605E+08 2.542105E+12 0.00005250 0.00119304 22.72461623 2331.92338
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1.338825E+08 2.502476E+12 0.00005350 0.00120995 22.61589342 2346.41763
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1.343025E+08 2.464265E+12 0.00005450 0.00122689 22.51172501 2360.43992
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1.347205E+08 2.427396E+12 0.00005550 0.00124386 22.41186315 2373.98729
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1.351365E+08 2.391796E+12 0.00005650 0.00126086 22.31608897 2387.05732
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1.368056E+08 2.224481E+12 0.00006150 0.00134373 21.84930414 2443.47841
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1.386452E+08 2.116721E+12 0.00006550 0.00141480 21.60000032 2482.48043
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1.400032E+08 1.904806E+12 0.00007350 0.00154369 21.00261873 2530.44417
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1.413756E+08 1.734670E+12 0.00008150 0.00166640 20.44660646 2549.32718
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1.417033E+08 1.697046E+12 0.00008350 0.00169736 20.32764512 2549.49942
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1.420043E+08 1.660869E+12 0.00008550 0.00172825 20.21350211 2544.39577
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1.422396E+08 1.625595E+12 0.00008750 0.00175845 20.09658140 2540.82166
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1.424724E+08 1.591870E+12 0.00008950 0.00178876 19.98613662 2544.92472
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1.427026E+08 1.559592E+12 0.00009150 0.00181918 19.88176543 2547.83163
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1.427026E+08 1.526231E+12 0.00009350 0.00185130 19.79999882 2549.59126
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1.428175E+08 1.495471E+12 0.00009550 0.00189090 19.79999882 2547.59774
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1.434988E+08 1.471782E+12 0.00009750 0.00192620 19.75591618 2542.35274
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1.437027E+08 1.444248E+12 0.00009950 0.00195577 19.65602535 2538.11269
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1.439051E+08 1.417784E+12 0.00010150 0.00198544 19.56097537 2542.00664
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1.440521E+08 1.391807E+12 0.00010350 0.00201413 19.46022838 2545.10220
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1.441941E+08 1.366769E+12 0.00010550 0.00204284 19.36341780 2547.44463
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1.443350E+08 1.342651E+12 0.00010750 0.00207163 19.27101034 2549.03701
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1.444745E+08 1.319402E+12 0.00010950 0.00210051 19.18277425 2549.86945

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1.447463E+08 1.275298E+12 0.00011350 0.00215871 19.01947600 2544.98232
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1.448803E+08 1.254375E+12 0.00011550 0.00218794 18.94323260 2541.43334
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1.450135E+08 1.234157E+12 0.00011750 0.00221724 18.87011129 2537.87351
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1.451459E+08 1.214610E+12 0.00011950 0.00224660 18.79996079 2534.65765
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1.452775E+08 1.195700E+12 0.00012150 0.00227602 18.73264593 2538.49174
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1.454084E+08 1.177396E+12 0.00012350 0.00230550 18.66802830 2541.78694
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1.454998E+08 1.159361E+12 0.00012550 0.00233405 18.59800333 2544.39009
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1.455901E+08 1.141883E+12 0.00012750 0.00236265 18.53055006 2546.50417
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1.456797E+08 1.124940E+12 0.00012950 0.00239130 18.46563953 2548.12571
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1.457687E+08 1.108507E+12 0.00013150 0.00242002 18.40316552 2549.24922
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1.458570E+08 1.092562E+12 0.00013350 0.00244879 18.34302181 2549.86899
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1.459441E+08 1.077078E+12 0.00013550 0.00247767 18.28541118 2549.18108
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1.460292E+08 1.062030E+12 0.00013750 0.00250670 18.23054606 2546.29970
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1.461140E+08 1.047412E+12 0.00013950 0.00253577 18.17752844 2543.41160
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1.462825E+08 1.019391E+12 0.00014350 0.00259401 18.07672995 2537.61520
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1.476109E+08 9.743296E+11 0.00015150 0.00272700 18.00000054 2536.11274
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1.484654E+08 9.547614E+11 0.00015550 0.00279900 18.00000054 2543.79153
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1.484654E+08 8.656874E+11 0.00017150 0.00304339 17.74574000 2543.88008
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1.484654E+08 8.459567E+11 0.00017550 0.00310256 17.67841548 2539.18488
60000.00000
1.484654E+08 8.271053E+11 0.00017950 0.00316185 17.61478275 2534.46792
60000.00000

1.484654E+08	8.090757E+11	0.00018350	0.00322127	17.55461973	2529.72856
60000.00000					
1.484654E+08	7.918154E+11	0.00018750	0.00328082	17.49771720	2524.96640
60000.00000					
1.484654E+08	7.752762E+11	0.00019150	0.00334051	17.44389170	2520.32206
60000.00000					
1.484654E+08	7.594138E+11	0.00019550	0.00340089	17.39584368	2526.96308
60000.00000					
1.484654E+08	7.441874E+11	0.00019950	0.00346245	17.35563308	2533.06809
60000.00000					
1.484654E+08	7.295597E+11	0.00020350	0.00352419	17.31791049	2538.27456
60000.00000					
1.484654E+08	7.154959E+11	0.00020750	0.00358613	17.28256005	2542.55961
60000.00000					
1.484654E+08	7.019640E+11	0.00021150	0.00364827	17.24948841	2545.89954
60000.00000					
1.484654E+08	6.889345E+11	0.00021550	0.00370890	17.21065217	2548.12531
60000.00000					
1.484654E+08	6.763799E+11	0.00021950	0.00376898	17.17074412	2549.46645
60000.00000					
1.484654E+08	6.642747E+11	0.00022350	0.00382923	17.13303119	2549.99260
60000.00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 148465.39377 in-kip

Axial Thrust Force = 105000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11412273.	2.282455E+13	5.000000E-07	0.00003060	61.20000118	94.07059618	828.57884
22709716.	2.270972E+13	0.00000100	0.00005770	57.69642895	175.73805	1555.55408
33889425.	2.259295E+13	0.00000150	0.00008483	56.55283910	256.13334	2283.58496
44945754.	2.247288E+13	0.00000200	0.00011192	55.96208149	335.03262	3010.51601
55887932.	2.235517E+13	0.00000250	0.00013911	55.64593917	412.82732	3740.22469
55887932.	1.862931E+13	0.00000300	0.00008777	29.25626940	260.87894	6497.77749

```
  55887932.  1.596798E+13    0.00000350    0.00010032   28.66196483     296.83675
 7641.06232
  55887932.  1.397198E+13    0.00000400    0.00011256   28.14087492     331.62450
 8793.08908
  55887932.  1.241954E+13    0.00000450    0.00012482   27.73879784     366.18376
 9944.69627
  55887932.  1.117759E+13    0.00000500    0.00013710   27.42004842     400.51382
11095.88119
  55887932.  1.016144E+13    0.00000550    0.00014939   27.16191584     434.61391
12246.64145
  55887932.  9.314655E+12    0.00000600    0.00016200   26.99999839     469.34939
13388.14613
  55887932.  8.598143E+12    0.00000650    0.00017438   26.82765251     503.14924
14536.31217
  55887932.  7.983990E+12    0.00000700    0.00018666   26.66508812     536.38160
15687.49060
  55887932.  7.451724E+12    0.00000750    0.00019895   26.52633208     569.38637
16838.20509
  55887932.  6.985992E+12    0.00000800    0.00021126   26.40692979     602.16266
17988.45342
  55887932.  6.575051E+12    0.00000850    0.00022358   26.30348235     634.70974
19138.23156
  55887932.  6.209770E+12    0.00000900    0.00023592   26.21334082     667.02673
20287.53682
  55887932.  5.882940E+12    0.00000950    0.00024828   26.13441950     699.11289
21436.36502
  55887932.  5.588793E+12    0.00001000    0.00026065   26.06504792     730.96742
22584.71252
  55887932.  5.322660E+12    0.00001050    0.00027304   26.00386781     762.58931
23732.57749
  55887932.  5.080721E+12    0.00001100    0.00028545   25.94978160     793.97798
24879.95373
  55887932.  4.859820E+12    0.00001150    0.00029787   25.90186554     825.13230
26026.84072
  55887932.  4.657328E+12    0.00001200    0.00031031   25.85936326     856.05154
27173.23329
  55887932.  4.471035E+12    0.00001250    0.00032277   25.82163745     886.73490
28319.12695
  55887932.  4.299072E+12    0.00001300    0.00033525   25.78814417     917.18142
29464.51899
  55887932.  4.139847E+12    0.00001350    0.00034774   25.75841993     947.39011
30609.40676
  57559887.  4.111420E+12    0.00001400    0.00036025   25.73207527     977.36024
31753.78442
  59470009.  4.101380E+12    0.00001450    0.00037278   25.70876902    1007.09088
32897.64843
  61377927.  4.091862E+12    0.00001500    0.00038532   25.68820184    1036.58094
34040.99682
  63283640.  4.082815E+12    0.00001550    0.00039789   25.67012268    1065.82969
35183.82330
  65187132.  4.074196E+12    0.00001600    0.00041047   25.65430623    1094.83616
```

36326.12418
   67088384. 4.065963E+12   0.00001650   0.00042307   25.64055294   1123.59931
37467.89651
   68987381. 4.058081E+12   0.00001700   0.00043569   25.62868899   1152.11817
38609.13624
   70884117. 4.050521E+12   0.00001750   0.00044832   25.61856312   1180.39187
39749.83795
   72778571. 4.043254E+12   0.00001800   0.00046098   25.61003691   1208.41935
40889.99829
   74670737. 4.036256E+12   0.00001850   0.00047366   25.60299128   1236.19973
42029.61155
   76560590. 4.029505E+12   0.00001900   0.00048635   25.59731358   1263.73184
43168.67541
   78448126. 4.022981E+12   0.00001950   0.00049906   25.59291047   1291.01484
44307.18315
   82216164. 4.010545E+12   0.00002050   0.00052455   25.58757716   1344.82902
46582.51703
   85974732. 3.998825E+12   0.00002150   0.00055011   25.58638948   1397.63395
48855.57546
   89723689. 3.987720E+12   0.00002250   0.00057575   25.58884853   1449.42084
51126.32327
   93462930. 3.977146E+12   0.00002350   0.00060147   25.59455198   1500.18120
53394.71741
   97192304. 3.967033E+12   0.00002450   0.00062728   25.60315543   1549.90583
55660.72029
1.009117E+08 3.957321E+12   0.00002550   0.00065317   25.61437565   1598.58559
57924.28907
1.045980E+08 3.947095E+12   0.00002650   0.00067909   25.62602395   1646.11421
60000.00000
1.075432E+08 3.910664E+12   0.00002750   0.00070343   25.57916361   1689.52651
60000.00000
1.099879E+08 3.859226E+12   0.00002850   0.00072667   25.49719423   1729.91716
60000.00000
1.121215E+08 3.800730E+12   0.00002950   0.00074922   25.39737099   1768.13298
60000.00000
1.140107E+08 3.738055E+12   0.00003050   0.00077122   25.28580934   1804.48765
60000.00000
1.158936E+08 3.679162E+12   0.00003150   0.00079380   25.20000011   1840.95386
60000.00000
1.173461E+08 3.610649E+12   0.00003250   0.00081674   25.13040322   1877.08062
60000.00000
1.187292E+08 3.544154E+12   0.00003350   0.00083717   24.99025673   1908.31513
60000.00000
1.200710E+08 3.480319E+12   0.00003450   0.00085753   24.85606152   1938.69181
60000.00000
1.212255E+08 3.414804E+12   0.00003550   0.00087732   24.71321779   1967.46612
60000.00000
1.223766E+08 3.352782E+12   0.00003650   0.00089715   24.57933480   1995.60756
60000.00000
1.233753E+08 3.290007E+12   0.00003750   0.00091647   24.43932670   2022.33990
60000.00000

1.243470E+08 3.229792E+12 0.00003850 0.00093576 24.30535358 2048.34512
60000.00000
1.252784E+08 3.171606E+12 0.00003950 0.00095493 24.17547137 2073.54845
60000.00000
1.260910E+08 3.113357E+12 0.00004050 0.00097369 24.04171389 2097.54960
60000.00000
1.269006E+08 3.057846E+12 0.00004150 0.00099248 23.91527563 2120.97731
60000.00000
1.276962E+08 3.004617E+12 0.00004250 0.00101127 23.79452151 2143.76804
60000.00000
1.283669E+08 2.950964E+12 0.00004350 0.00102956 23.66812509 2165.34139
60000.00000
1.290350E+08 2.899663E+12 0.00004450 0.00104789 23.54817563 2186.36672
60000.00000
1.297005E+08 2.850560E+12 0.00004550 0.00106626 23.43425471 2206.84091
60000.00000
1.302336E+08 2.800722E+12 0.00004650 0.00108810 23.39999861 2230.60863
60000.00000
1.309764E+08 2.757398E+12 0.00004750 0.00110693 23.30386072 2250.28456
60000.00000
1.315069E+08 2.711482E+12 0.00004850 0.00112427 23.18072480 2267.76378
60000.00000
1.320352E+08 2.667378E+12 0.00004950 0.00114163 23.06321186 2284.75047
60000.00000
1.325614E+08 2.624978E+12 0.00005050 0.00115903 22.95099682 2301.24197
60000.00000
1.330366E+08 2.583234E+12 0.00005150 0.00117616 22.83814770 2316.95952
60000.00000
1.334605E+08 2.542105E+12 0.00005250 0.00119304 22.72461623 2331.92338
60000.00000
1.338825E+08 2.502476E+12 0.00005350 0.00120995 22.61589342 2346.41763
60000.00000
1.343025E+08 2.464265E+12 0.00005450 0.00122689 22.51172501 2360.43992
60000.00000
1.347205E+08 2.427396E+12 0.00005550 0.00124386 22.41186315 2373.98729
60000.00000
1.351365E+08 2.391796E+12 0.00005650 0.00126086 22.31608897 2387.05732
60000.00000
1.354898E+08 2.356345E+12 0.00005750 0.00127748 22.21707362 2399.33402
60000.00000
1.358215E+08 2.321735E+12 0.00005850 0.00129400 22.11966115 2411.05331
60000.00000
1.361514E+08 2.288258E+12 0.00005950 0.00131055 22.02601451 2422.31878
60000.00000
1.368056E+08 2.224481E+12 0.00006150 0.00134373 21.84930414 2443.47841
60000.00000
1.374524E+08 2.164605E+12 0.00006350 0.00137704 21.68561643 2462.79237
60000.00000
1.386452E+08 2.116721E+12 0.00006550 0.00141480 21.60000032 2482.48043
60000.00000
1.386452E+08 2.054003E+12 0.00006750 0.00144968 21.47670346 2498.36789

60000.00000
1.390856E+08 2.001232E+12 0.00006950 0.00148094 21.30846781 2510.72668
60000.00000
1.395528E+08 1.951788E+12 0.00007150 0.00151231 21.15123993 2521.43549
60000.00000
1.400032E+08 1.904806E+12 0.00007350 0.00154369 21.00261873 2530.44417
60000.00000
1.403548E+08 1.859004E+12 0.00007550 0.00157420 20.85036367 2537.56090
60000.00000
1.407008E+08 1.815494E+12 0.00007750 0.00160482 20.70738477 2543.09259
60000.00000
1.410411E+08 1.774102E+12 0.00007950 0.00163555 20.57300287 2547.02093
60000.00000
1.413756E+08 1.734670E+12 0.00008150 0.00166640 20.44660646 2549.32718
60000.00000
1.417033E+08 1.697046E+12 0.00008350 0.00169736 20.32764512 2549.49942
60000.00000
1.420043E+08 1.660869E+12 0.00008550 0.00172825 20.21350211 2544.39577
60000.00000
1.422396E+08 1.625595E+12 0.00008750 0.00175845 20.09658140 2540.82166
60000.00000
1.424724E+08 1.591870E+12 0.00008950 0.00178876 19.98613662 2544.92472
60000.00000
1.427026E+08 1.559592E+12 0.00009150 0.00181918 19.88176543 2547.83163
60000.00000
1.427026E+08 1.526231E+12 0.00009350 0.00185130 19.79999882 2549.59126
60000.00000
1.428175E+08 1.495471E+12 0.00009550 0.00189090 19.79999882 2547.59774
60000.00000
1.434988E+08 1.471782E+12 0.00009750 0.00192620 19.75591618 2542.35274
60000.00000
1.437027E+08 1.444248E+12 0.00009950 0.00195577 19.65602535 2538.11269
60000.00000
1.439051E+08 1.417784E+12 0.00010150 0.00198544 19.56097537 2542.00664
60000.00000
1.440521E+08 1.391807E+12 0.00010350 0.00201413 19.46022838 2545.10220
60000.00000
1.441941E+08 1.366769E+12 0.00010550 0.00204284 19.36341780 2547.44463
60000.00000
1.443350E+08 1.342651E+12 0.00010750 0.00207163 19.27101034 2549.03701
60000.00000
1.444745E+08 1.319402E+12 0.00010950 0.00210051 19.18277425 2549.86945
60000.00000
1.446116E+08 1.296965E+12 0.00011150 0.00212954 19.09900242 2548.52058
60000.00000
1.447463E+08 1.275298E+12 0.00011350 0.00215871 19.01947600 2544.98232
60000.00000
1.448803E+08 1.254375E+12 0.00011550 0.00218794 18.94323260 2541.43334
60000.00000
1.450135E+08 1.234157E+12 0.00011750 0.00221724 18.87011129 2537.87351
60000.00000

1.451459E+08 1.214610E+12 0.00011950 0.00224660 18.79996079 2534.65765
60000.00000
1.452775E+08 1.195700E+12 0.00012150 0.00227602 18.73264593 2538.49174
60000.00000
1.454084E+08 1.177396E+12 0.00012350 0.00230550 18.66802830 2541.78694
60000.00000
1.454998E+08 1.159361E+12 0.00012550 0.00233405 18.59800333 2544.39009
60000.00000
1.455901E+08 1.141883E+12 0.00012750 0.00236265 18.53055006 2546.50417
60000.00000
1.456797E+08 1.124940E+12 0.00012950 0.00239130 18.46563953 2548.12571
60000.00000
1.457687E+08 1.108507E+12 0.00013150 0.00242002 18.40316552 2549.24922
60000.00000
1.458570E+08 1.092562E+12 0.00013350 0.00244879 18.34302181 2549.86899
60000.00000
1.459441E+08 1.077078E+12 0.00013550 0.00247767 18.28541118 2549.18108
60000.00000
1.460292E+08 1.062030E+12 0.00013750 0.00250670 18.23054606 2546.29970
60000.00000
1.461140E+08 1.047412E+12 0.00013950 0.00253577 18.17752844 2543.41160
60000.00000
1.462825E+08 1.019391E+12 0.00014350 0.00259401 18.07672995 2537.61520
60000.00000
1.466286E+08 9.940921E+11 0.00014750 0.00265500 18.00000054 2531.33751
60000.00000
1.476109E+08 9.743296E+11 0.00015150 0.00272700 18.00000054 2536.11274
60000.00000
1.484654E+08 9.547614E+11 0.00015550 0.00279900 18.00000054 2543.79153
60000.00000
1.484654E+08 9.308175E+11 0.00015950 0.00287010 17.99433571 2548.34886
60000.00000
1.484654E+08 9.080452E+11 0.00016350 0.00292687 17.90136498 2549.72462
60000.00000
1.484654E+08 8.863606E+11 0.00016750 0.00298435 17.81700414 2548.55401
60000.00000
1.484654E+08 8.656874E+11 0.00017150 0.00304339 17.74574000 2543.88008
60000.00000
1.484654E+08 8.459567E+11 0.00017550 0.00310256 17.67841548 2539.18488
60000.00000
1.484654E+08 8.271053E+11 0.00017950 0.00316185 17.61478275 2534.46792
60000.00000
1.484654E+08 8.090757E+11 0.00018350 0.00322127 17.55461973 2529.72856
60000.00000
1.484654E+08 7.918154E+11 0.00018750 0.00328082 17.49771720 2524.96640
60000.00000
1.484654E+08 7.752762E+11 0.00019150 0.00334051 17.44389170 2520.32206
60000.00000
1.484654E+08 7.594138E+11 0.00019550 0.00340089 17.39584368 2526.96308
60000.00000
1.484654E+08 7.441874E+11 0.00019950 0.00346245 17.35563308 2533.06809

```
  60000.00000
  1.484654E+08  7.295597E+11    0.00020350    0.00352419   17.31791049    2538.27456
  60000.00000
  1.484654E+08  7.154959E+11    0.00020750    0.00358613   17.28256005    2542.55961
  60000.00000
  1.484654E+08  7.019640E+11    0.00021150    0.00364827   17.24948841    2545.89954
  60000.00000
  1.484654E+08  6.889345E+11    0.00021550    0.00370890   17.21065217    2548.12531
  60000.00000
  1.484654E+08  6.763799E+11    0.00021950    0.00376898   17.17074412    2549.46645
  60000.00000
  1.484654E+08  6.642747E+11    0.00022350    0.00382923   17.13303119    2549.99260
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =  148465.39377
in-kip



--------------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  1
--------------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       56000.000 lbs
Specified moment at pile head       =    76212000.000 in-lbs
Specified axial load at pile head   =      105000.000 lbs

  Depth   Deflect.  Moment     Shear     Slope     Total   Flx. Rig. Soil Res.
Es*h
    X        y        M          V         S       Stress      EI        p
F/L
    in       in      lbs-in      lbs       Rad.  lbs/in**2 lbs-in**2  lbs/in
-------- --------- --------- --------- --------- --------- --------- ---------
---------
   0.000  0.824828  7.62E+07    56000. -0.005635   627.705  4.03E+12     0.000
0.000
  26.880  0.680240  7.77E+07    54419. -0.005121   639.936  4.03E+12  -202.439
999.936
  53.760  0.549600  7.91E+07    43004. -0.004597   650.968  4.02E+12  -958.806
5861.692
  80.640  0.433163  7.98E+07  3741.723 -0.004065   656.724  4.02E+12 -2082.488
16154.
 107.520  0.331050  7.90E+07   -67176. -0.003533   650.467  4.02E+12 -3173.176
32206.
 134.400  0.243103  7.60E+07 -1.66E+05 -0.003014   625.773  4.03E+12 -5123.434
70813.
 161.280  0.168718  6.97E+07 -3.00E+05 -0.002528   574.963  4.06E+12 -4689.563
93392.
```

```
 188.160  0.106699  6.00E+07 -4.13E+05 -0.002098   497.019  4.10E+12 -3682.739
1.16E+05
 215.040  0.052919  4.78E+07 -4.93E+05 -0.001961   397.766  2.24E+13 -2182.143
1.39E+05
 241.920  0.000890  3.40E+07 -5.25E+05 -0.001913   286.073  2.26E+13   -42.701
1.61E+05
 268.800 -0.050052  2.02E+07 -4.90E+05 -0.001881   174.435  2.27E+13  2736.580
1.84E+05
 295.680 -0.100347  8.36E+06 -3.72E+05 -0.001864    79.094  2.28E+13  6160.831
2.06E+05
 322.560 -0.150366  1.06E+06 -1.53E+05 -0.001859    20.061  2.28E+13    10242.
2.29E+05
```

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     0.82482826 in
Computed slope at pile head      =    -0.00563492
Maximum bending moment           =      79803041. lbs-in
Maximum shear force              =  -524807.97776 lbs
Depth of maximum bending moment  =    84.00000000 in
Depth of maximum shear force     =      241.92000 in
Number of iterations             =             38
Number of zero deflection points =              1
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)

```
Specified shear force at pile head  =       23000.000 lbs
Specified moment at pile head       =    31860000.000 in-lbs
Specified axial load at pile head   =      105000.000 lbs
```

```
  Depth   Deflect.  Moment     Shear     Slope     Total   Flx. Rig. Soil Res.
Es*h
    X        y        M         V         S       Stress      EI        p
```

F/L in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in
0.000	0.225214	3.19E+07	23000.	-0.001098	269.079	2.26E+13	0.000
0.000							
26.880	0.196204	3.25E+07	22549.	-0.001060	274.085	2.26E+13	-58.390
999.936							
53.760	0.168233	3.31E+07	18146.	-0.001021	278.724	2.26E+13	-492.785
9842.069							
80.640	0.141317	3.33E+07	-1455.094	-0.000982	280.889	2.26E+13	-1084.804
25793.							
107.520	0.115465	3.29E+07	-34642.	-0.000942	277.122	2.26E+13	-1351.907
39340.							
134.400	0.090660	3.14E+07	-73213.	-0.000904	265.548	2.26E+13	-1910.684
70813.							
161.280	0.066857	2.88E+07	-1.25E+05	-0.000868	244.053	2.26E+13	-1858.293
93392.							
188.160	0.043968	2.48E+07	-1.71E+05	-0.000836	211.839	2.27E+13	-1517.551
1.16E+05							
215.040	0.021865	1.97E+07	-2.04E+05	-0.000810	170.889	2.27E+13	-901.618
1.39E+05							
241.920	0.000388	1.40E+07	-2.17E+05	-0.000790	124.800	2.28E+13	-18.607
1.61E+05							
268.800	-0.020645	8.32E+06	-2.02E+05	-0.000776	78.728	2.28E+13	1128.749
1.84E+05							
295.680	-0.041412	3.45E+06	-1.53E+05	-0.000770	39.377	2.28E+13	2542.484
2.06E+05							
322.560	-0.062065	4.39E+05	-63102.	-0.000768	15.011	2.28E+13	4227.558
2.29E+05							

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

Pile-head deflection	=	0.22521399 in
Computed slope at pile head	=	-0.00109829
Maximum bending moment	=	33320563. lbs-in
Maximum shear force	=	-216572.90600 lbs
Depth of maximum bending moment	=	80.64000000 in
Depth of maximum shear force	=	241.92000 in
Number of iterations	=	5

Number of zero deflection points = 1

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 56000.	M= 7.62E+07	105000.	0.8248283	7.9803E+07	-524808.
1	V= 23000.	M= 3.19E+07	105000.	0.2252140	3.3321E+07	-216573.

Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

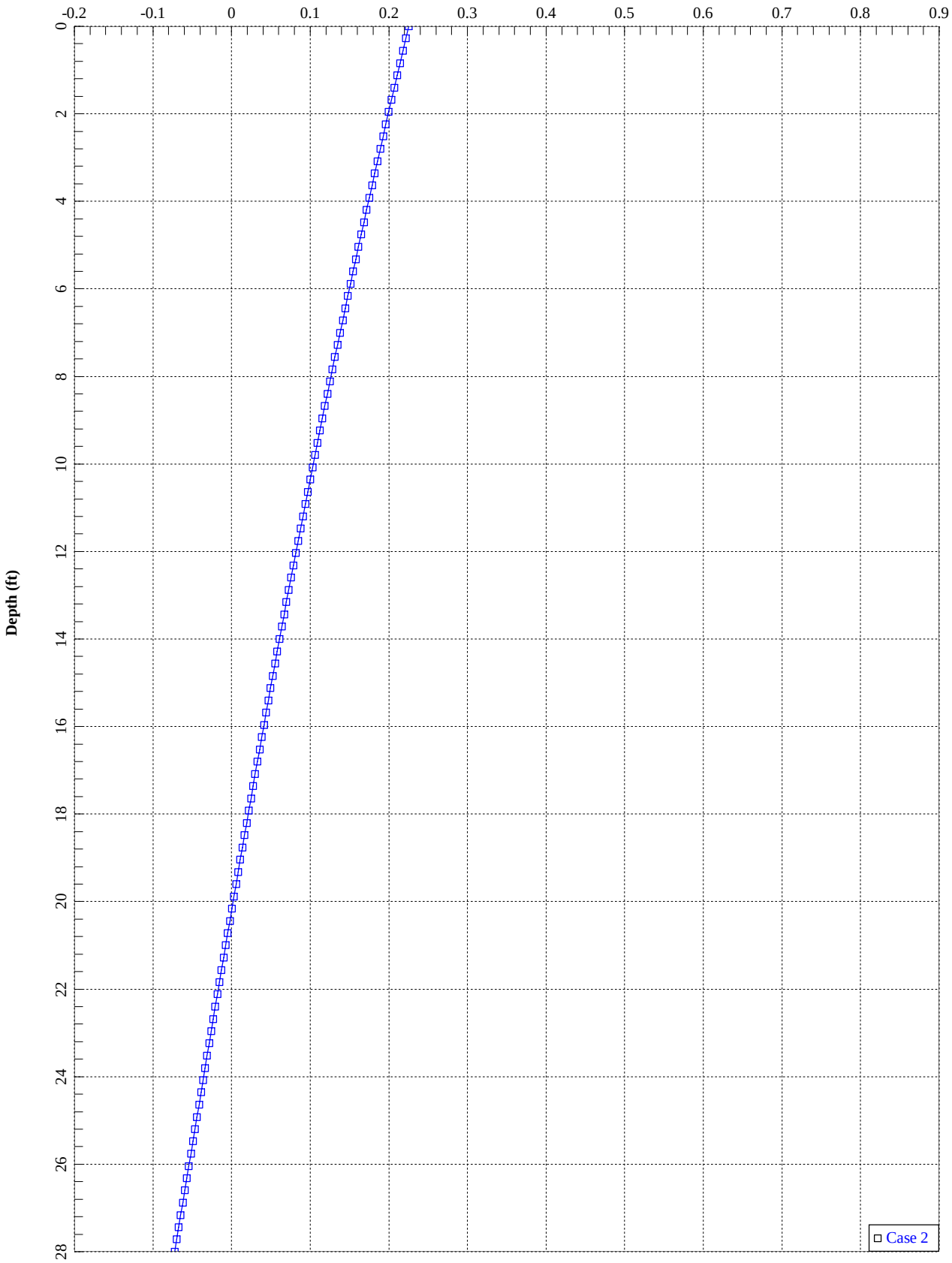
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00144712	5600.00008	1119493.	3869756.	7.736006E+08
0.00435626	16857.67976	3370009.	3869756.	7.736006E+08
0.00690452	26718.79026	5341337.	3869756.	7.736006E+08
0.00871253	33715.35951	6740017.	3869756.	7.736006E+08
0.01011493	39142.32024	7824918.	3869756.	7.736006E+08
0.01126078	43576.47002	8711346.	3869756.	7.736006E+08
0.01222958	47325.49024	9460810.	3869756.	7.736006E+08
0.01306879	50573.03927	10110026.	3869756.	7.736006E+08
0.01380903	53437.58053	10682675.	3869756.	7.736006E+08
0.01447120	56000.00000	11194927.	3869756.	7.736006E+08

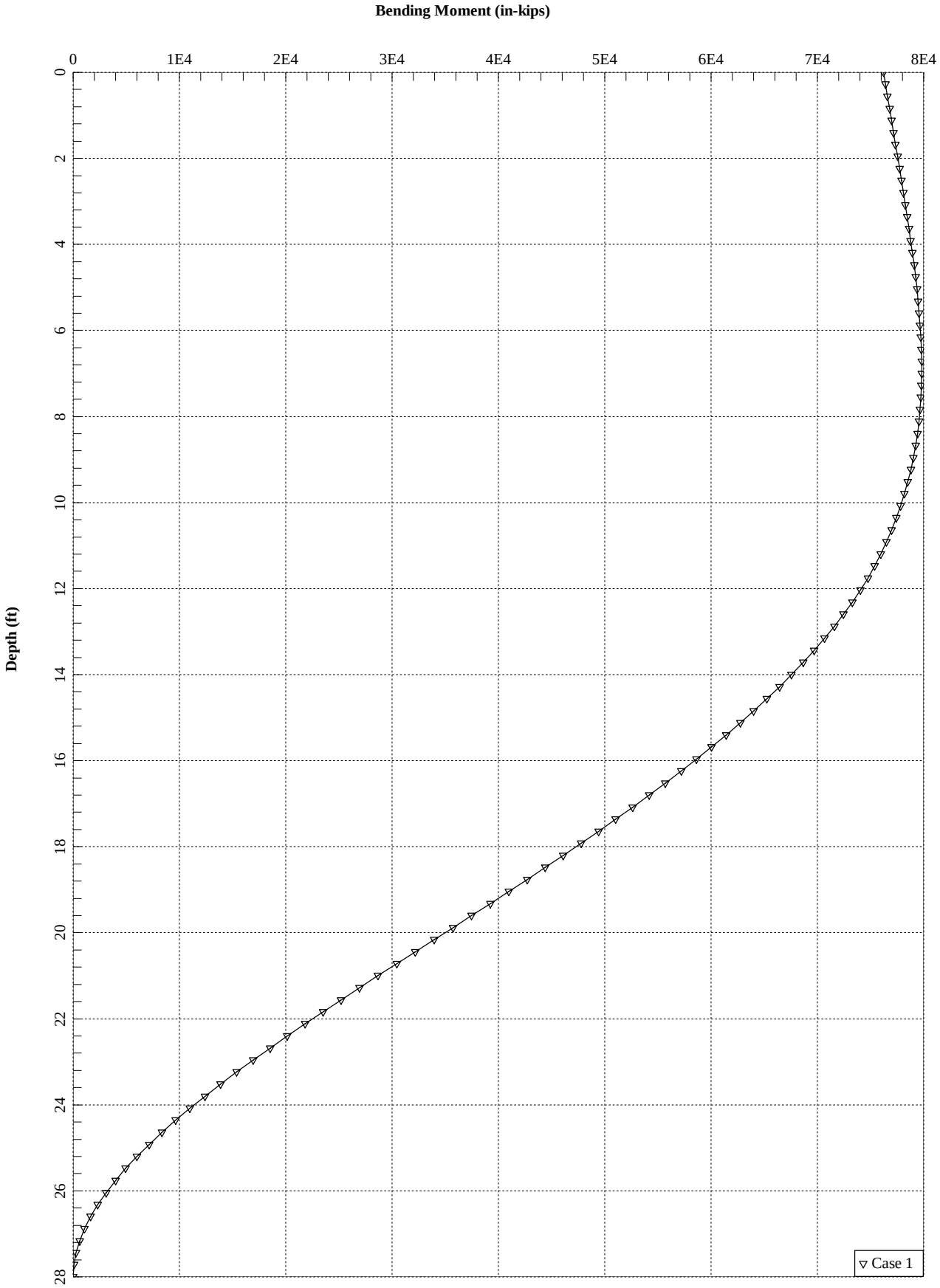
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00004056	31373.92590	7621200.	7.736006E+08	1.879193E+11
0.00012235	94453.52703	22942098.	7.720158E+08	1.875172E+11
0.00019448	149731.44610	36362365.	7.698883E+08	1.869678E+11

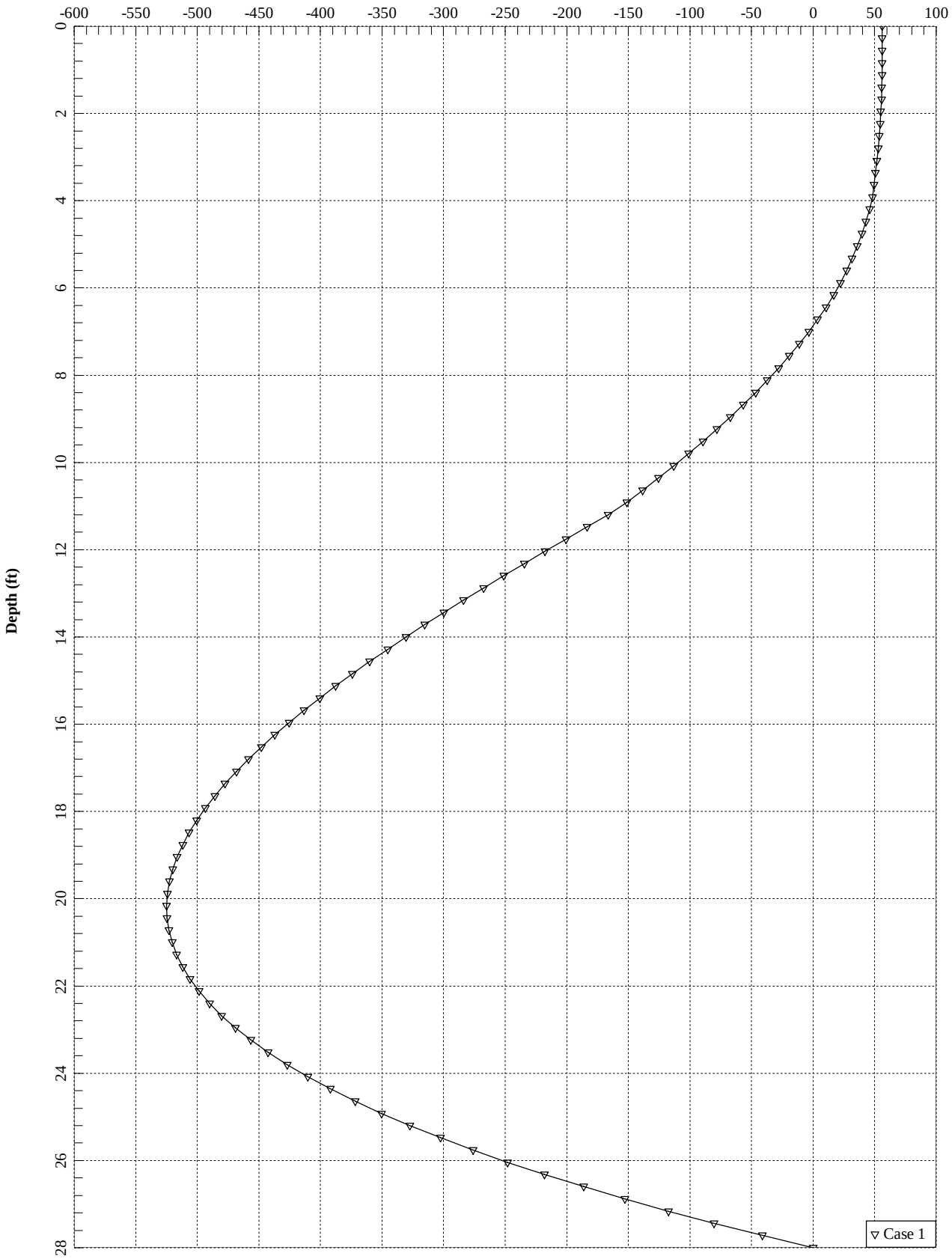
```
   0.00024596  188965.97077     45884196.  7.682826E+08  1.865523E+11
   0.00028606  219406.94943     53269902.  7.670087E+08  1.862223E+11
   0.00032303  244298.14865     59304463.  7.562760E+08  1.835894E+11
   0.00037392  265506.00850     64406612.  7.100622E+08  1.722473E+11
   0.00081617  289648.14906     68826294.  3.548869E+08  8.432834E+10
   0.00096284  309607.78511     72724730.  3.215573E+08  7.553158E+10
   0.00107940  327576.17838     76212000.  3.034800E+08  7.060591E+10

  K22 = abs(Shear Reaction/Top y)
  K23 = abs(Shear Reaction/Top Rotation)
  K32 = abs(Moment Reaction/Top y)
  K33 = abs(Moment Reaction/Top Rotation)


The analysis ended normally.
```


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 2


Bending Moment (in-kips)
0
1E4
2E4
3E4
4E4
5E4
6E4
7E4
8E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-600
-550
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 1 - Site Information

Site ID: CTFF001A
Status: Draft
Version: 4
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 6/30/2020 4:49:52 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

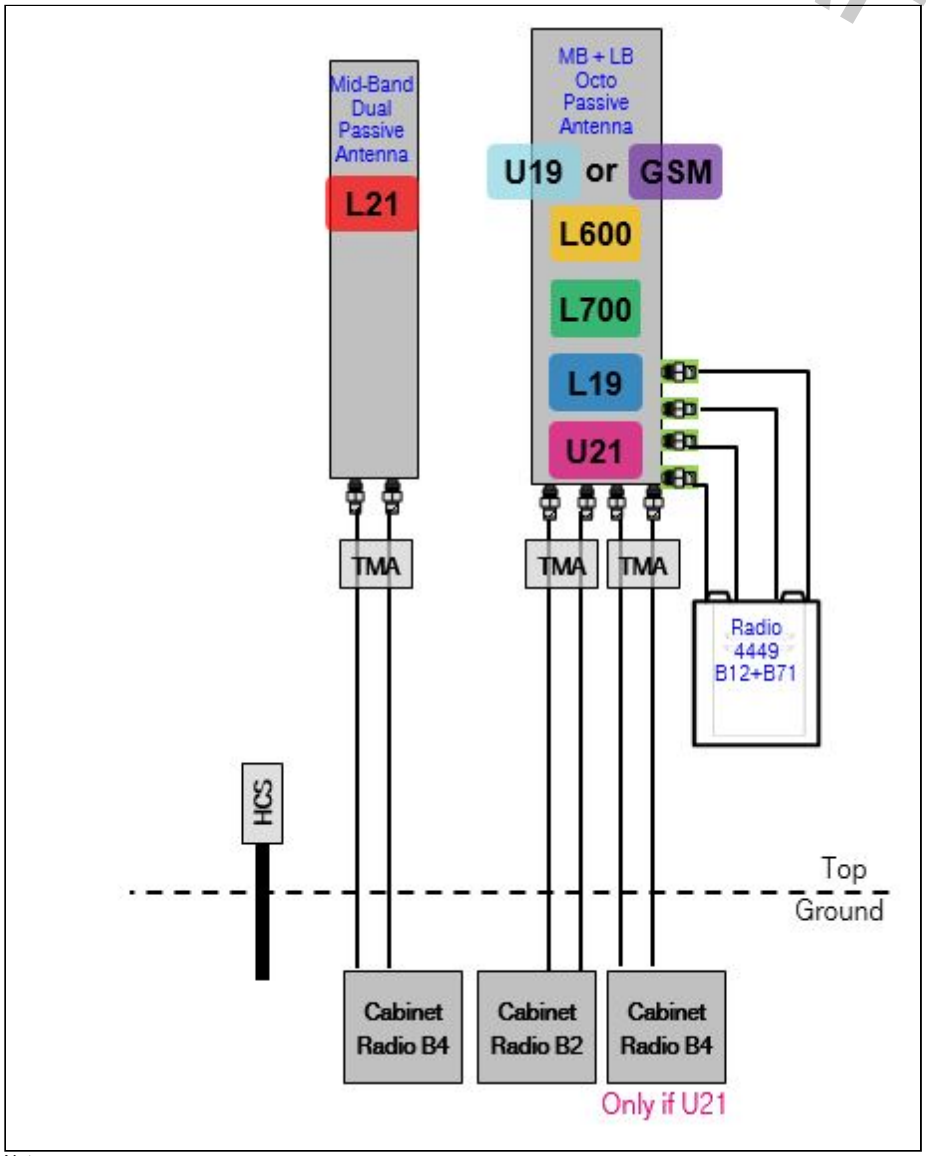
Site Name: FF001/Greenwich_Hospital
Site Class: Monopole
Site Type: Structure Non Building
Plan Year: 2020
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Greenwich Hospital

Latitude: 41.03393400
Longitude: -73.63082900
Address: 5 Perryridge Rd
City, State: Greenwich, CT
Region: NORTHEAST

RAN Template: 67D5A997DB Outdoor			AL Template: 67D5997DB_2xAIR+1OP (U21 Market)	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 6	**TMA Count:** 3	**RRU Count:** 6

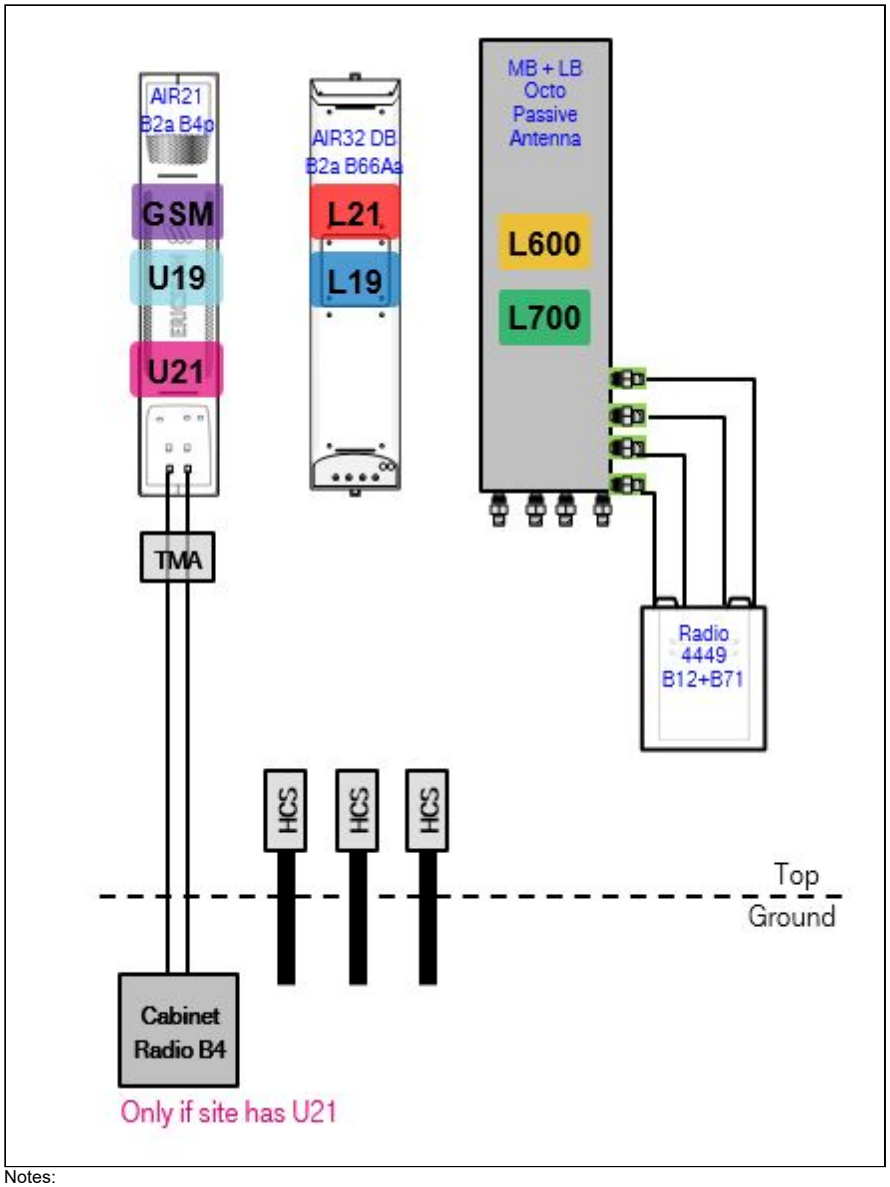
Section 2 - Existing Template Images

67D94B_1DP+1OP.JPG



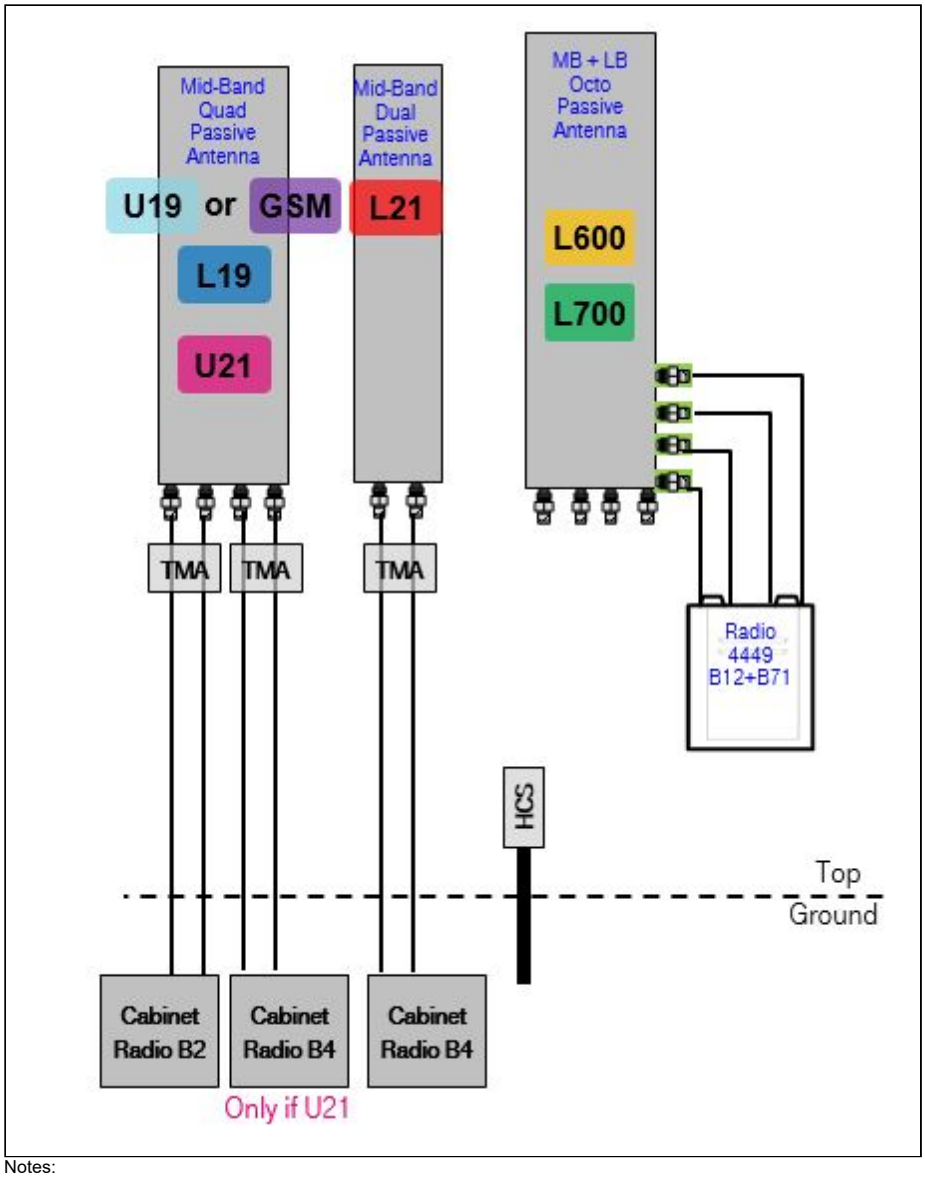
Notes:

67D92DB_2xAIR+1OP.JPG



Notes:

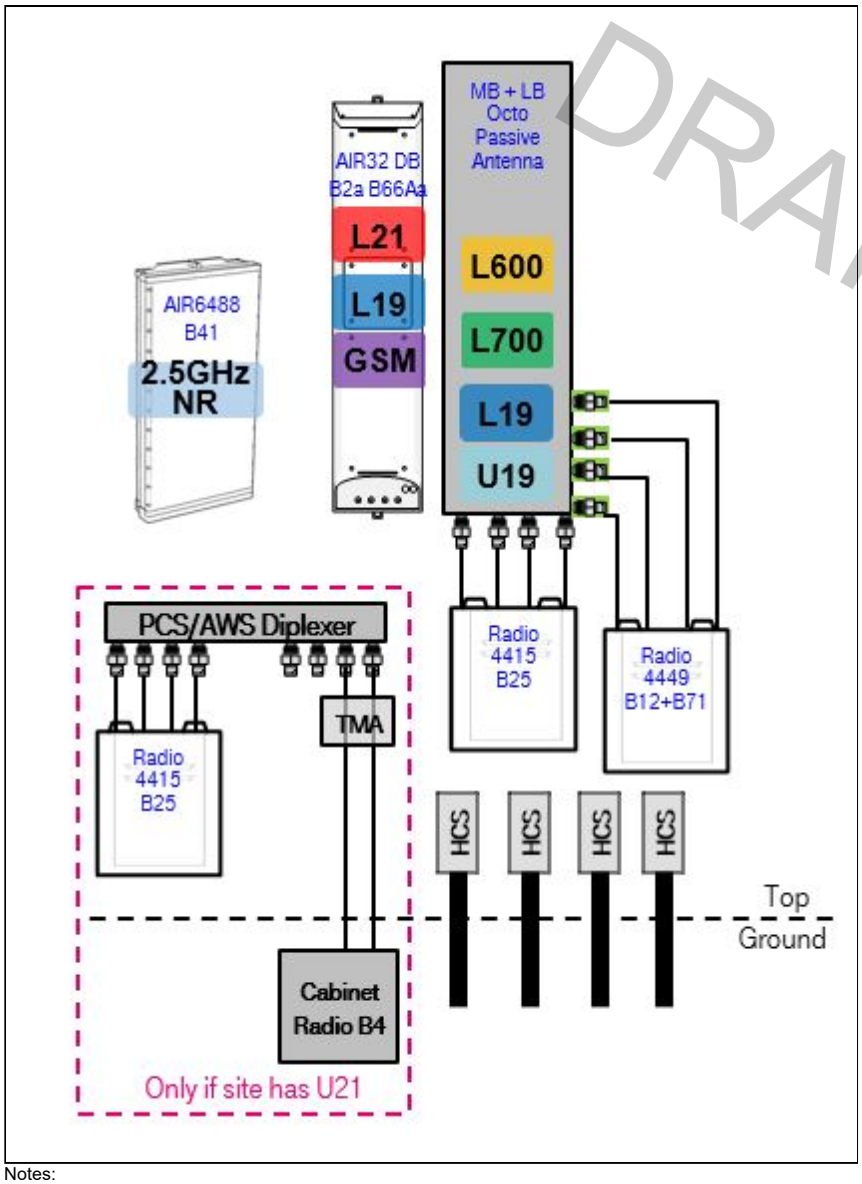
67D94B_1DP+1QP+1OP.JPG


Mid-Band
Quad
Passive
Antenna
U19
or
GSM
L19
U21
Mid-Band
Dual
Passive
Antenna
L21
MB + LB
Octo
Passive
Antenna
L600
L700
TMA
TMA
TMA
Radio
4449
B12+B71
HCS
Top
Ground
Cabinet
Radio B2
Cabinet
Radio B4
Cabinet
Radio B4
Only if U21

Notes:

Section 3 - Proposed Template Images

67D5997DB_2xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D92DB Outdoor

Enclosure	1	2
Enclosure Type	RBS 6102	Ancillary Equipment (Ericsson)
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); BB 6630 (L700, L600, L2100, L1900); BB 6630 (N600)	
Hybrid Cable System		Ericsson 6x12 HCS 4AWG 120m **(x 3)**
Radio	RUS01 B4 **(x 3)** (U2100); RUS01 B4 **(x 3)** (L2100)	

Proposed RAN Equipment

Template: 67D5A997DB Outdoor

Enclosure	1	2	3	4
Enclosure Type	RBS 6102	Ancillary Equipment (Ericsson)	Enclosure 6160	B160
Baseband	DUW30; DUW30 (U2100); DUG20 (G1900); BB 6630 (L2100, L1900, L700, L600); BB 6630 (N600)		BB 6630 (L2500); BB 6648 (N2500)	
Hybrid Cable System		Ericsson 6x12 HCS 4AWG 120m **(x 3)**	Ericsson 6x12 HCS 4AWG 120m **(x 3)**	
Radio	RUS01 B4 **(x 3)** (U2100); RUS01 B4 **(x 3)**			

RAN Scope of Work:

Remove Nortel Cabinets.

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Add (1) iXRe Router to new Enclosure 6160.

Add (1) BB6630 for L2500 to new Enclosure 6160.

Add (1) BB6648 for N2500 to new Enclosure 6160.

Existing: (12) Coaxial Lines; (3) 6X12 HCS

Remove (6) Coaxial Lines for new total of (6) Coaxial Lines.

Add (3) 6X12 HCS. Make sure that there is at least (1) 6X12 HCS for new AIR6449 (1 DC and 4 fiber pairs per antenna). Length of new HCS will match that of existing HCS.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 67D92DB_2xAIR+1OP
Proposed Template: 67D5997DB_2xAIR+1OP (U21 Market)

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	40		40				40			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	G1900	U2100	L700 L600 N600	L700 L600 N600			L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax **(x2)** Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**						
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)							
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	40		40				40			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** Generic Feeder Coax **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect them to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of AWS/PCS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	**1**		**2**				**3**			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	140		140				140			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	G1900	U2100	L700 L600 N600	L700 L600 N600			L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax **(x2)** Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**						
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)							
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	140		140				140			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** Generic Feeder Coax **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect them to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of AWS/PCS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	**1**		**2**				**3**			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	280		280				280			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
Active Tech.	G1900	U2100	L700 L600 N600	L700 L600 N600			L2100	L2100	L1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.	U1900									
E. Tilt										
Cables		Generic Feeder Coax **(x2)** Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**						
TMAs		Generic Twin Style 1B - AWS (AtAntenna)								
Diplexers / Combiners										
Radio			Radio 4449 B71+B85 (At Antenna)							
Sector Equipment										

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1		2				3			
Antenna Model	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	280		280				280			
M. Tilt	0		0				0			
Height	144		144				144			
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900	L1900 U2100	L2100	L2100	L1900 G1900	L1900
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables			Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)**	Coax Jumper **(x2)** Generic Feeder Coax **(x2)**				
TMAs						Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners					Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)				
Radio			Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna)				
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Remove AIR21 B2A/B4P from Position 1.

Install AIR6449 B41 for L2500 and N2500 in Position 1.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Move coaxial lines and AWS TMA for U2100 to Position 2, and connect them to two AWS input ports of the diplexer.

Make sure to install metal caps on all empty ports of AWS/PCS diplexer for load balancing.

Move GSM to AIR32 DB in Position 3. GSM will share B2 Radios with L1900 1st Carrier.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D5A997DB Outdoor	67D5997DB_2xAIR+1OP (U21 Market)

CTFF001A_Anchor_4_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

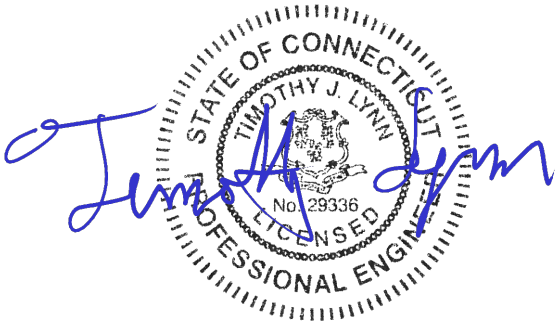
T-Mobile Site #: CTFF001A

5 Perryridge Road
Greenwich, CT

Centek Project No. 20074.46

Date: July 13, 2020

Max Stress Ratio =96.4%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 13, 2020

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTFF001A
5 Perryridge Road
Greenwich, CT 06830

Centek Project No. 20074.46

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) low profile platform to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Low Profile Platform: Three (3) RFS APXVAARR24_43 panel antennas, three (3) Ericsson AIR32 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) TMAs, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4415 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on one (1) low profile platform with a RAD center elevation of 144-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 93 mph for Greenwich as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the equipment upgrade, it is our opinion that the existing antenna platform with the installation of one (1) SitePro handrail (p/n HRK14), using 16-ft long horizontal pipes, is structurally adequate to support the proposed antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Section 2 - Calculations

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

Subject: TIA-222-G Loads

Location: Greenwich, CT

Rev. 0: 7/13/20

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 20074.46

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

Wind Speeds

Basic Wind Speed $V := 93$ mph (User Input - 2018 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = SC := II (User Input)

Exposure Category = Exp := C (User Input)

Structure Height = $h := 164$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 144$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.159$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.738$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.367$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 28.746$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 8.309$$

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Subject:	TIA-222-G Loads
Location:	Greenwich, CT
Rev. 0: 7/13/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.46

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 640$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 232$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 219$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 97$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 429$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 429$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 206$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 139$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 80$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 60$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 132$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5627$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 182$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 182$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 179$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 72$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 67$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 33$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 103$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4695$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 152$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 152$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12	
RRUS Shape =	Flat	(User Input)
RRUS Height =	$L_{RRUS} := 14.9$ in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$ in	(User Input)
RRUS Thickness =	$T_{RRUS} := 10.4$ in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$ lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$	(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$	
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$	

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 41$	lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 19$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2240$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 72$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 72$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4415 B25

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 47$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 21$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 23$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 12$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 47$ lbs

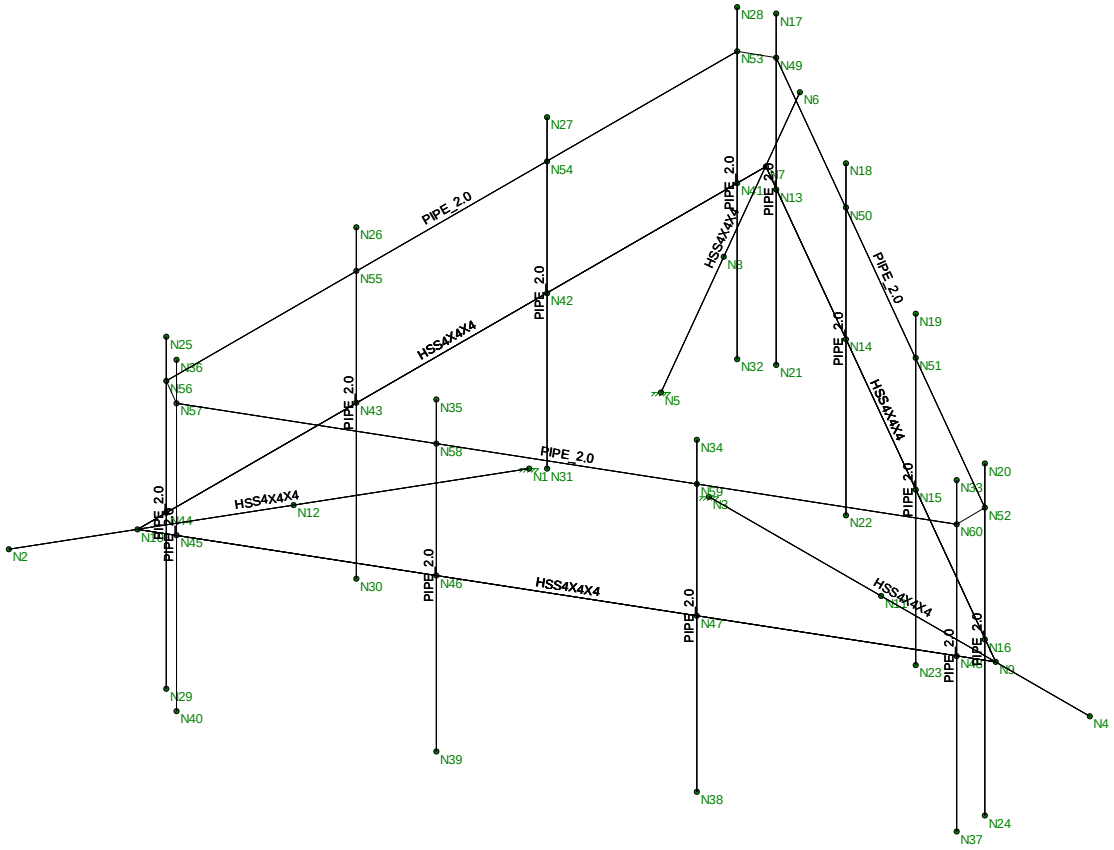
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1658$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 54$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 54$ lbs



Envelope Only Solution

Centek		
TJL	CTFF001A - Mount	July 13, 2020 at 11:08 AM
20074.46	Member Framing	CTFF001A_AMA.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 (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	.145
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#6
Footing Top Bar Cover (in)	1.5
Footing Bottom Bar	#6
Footing Bottom Bar Cover (in)	3
Pedestal Bar	#6
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#4

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
2	Horz	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
4	(P) Hand Rail	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Outrigger	10			Lbyy						Lateral
2	M2	Outrigger	10			Lbyy						Lateral
3	M3	Outrigger	10			Lbyy						Lateral
4	M4	Horz	16.5	Segment		Lbyy						Lateral
5	M5	Horz	16.5	Segment		Lbyy						Lateral
6	M6	Horz	16.5	Segment		Lbyy						Lateral
7	M7	Antenna Mast	8			Lbyy						Lateral
8	M8	Antenna Mast	8			Lbyy						Lateral
9	M9	Antenna Mast	8			Lbyy						Lateral
10	M10	Antenna Mast	8	Segment	Segment	Segment	Segment	Segm...				Lateral
11	M11	Antenna Mast	8			Lbyy						Lateral
12	M12	Antenna Mast	8			Lbyy						Lateral
13	M13	Antenna Mast	8			Lbyy						Lateral
14	M14	Antenna Mast	8	Segment	Segment	Segment	Segment	Segm...				Lateral
15	M15	Antenna Mast	8			Lbyy						Lateral
16	M16	Antenna Mast	8			Lbyy						Lateral
17	M17	Antenna Mast	8			Lbyy						Lateral
18	M18	Antenna Mast	8	Segment	Segment	Segment	Segment	Segm...				Lateral
19	M19	(P) Hand Rail	15	Segment		Lbyy						Lateral
20	M20	(P) Hand Rail	15	Segment		Lbyy						Lateral
21	M21	(P) Hand Rail	15	Segment		Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			Outrigger	Beam	None	A500 Gr....	Typical
2	M2	N3	N4			Outrigger	Beam	None	A500 Gr....	Typical
3	M3	N5	N6			Outrigger	Beam	None	A500 Gr....	Typical
4	M4	N7	N9			Horz	Beam	None	A500 Gr....	Typical
5	M5	N10	N7			Horz	Beam	None	A500 Gr....	Typical
6	M6	N9	N10			Horz	Beam	None	A500 Gr....	Typical
7	M7	N24	N20			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
8	M8	N23	N19			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
9	M9	N22	N18			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
10	M10	N21	N17			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
11	M11	N32	N28			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
12	M12	N31	N27			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
13	M13	N30	N26			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
14	M14	N29	N25			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
15	M15	N40	N36			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
16	M16	N39	N35			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
17	M17	N38	N34			Antenna Mast	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
18	M18	N37	N33			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
19	M19	N53	N56			(P) Hand Rail	Beam	Pipe	A53 Gr.B	Typical
20	M20	N49	N52			(P) Hand Rail	Beam	Pipe	A53 Gr.B	Typical
21	M21	N60	N57			(P) Hand Rail	Beam	Pipe	A53 Gr.B	Typical
22	M22	N56	N57			RIGID	None	None	RIGID	Typical
23	M23	N53	N49			RIGID	None	None	RIGID	Typical
24	M24	N60	N52			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	-1	0	1.732051	0	
2	N2	-6	0	10.392305	0	
3	N3	2	0	0.	0	
4	N4	12	0	-0.	0	
5	N5	-1	0	-1.732051	0	
6	N6	-6.	0	-10.392305	0	
7	N7	-4.76314	0	-8.25	0	
8	N8	-3.26314	0	-5.651924	0	
9	N9	9.526279	0	0.	0	
10	N10	-4.76314	0	8.25	0	
11	N11	6.526279	0	0.	0	
12	N12	-3.26314	0	5.651924	0	
13	N13	-4.113621	0	-7.875	0	
14	N14	0.216506	0	-5.375	0	
15	N15	4.546633	0	-2.875	0	
16	N16	8.87676	0	-0.375	0	
17	N17	-4.113621	4	-7.875	0	
18	N18	0.216506	4	-5.375	0	
19	N19	4.546633	4	-2.875	0	
20	N20	8.87676	4	-0.375	0	
21	N21	-4.113621	-4	-7.875	0	
22	N22	0.216506	-4	-5.375	0	
23	N23	4.546633	-4	-2.875	0	
24	N24	8.87676	-4	-0.375	0	
25	N25	-4.76314	4	7.5	0	
26	N26	-4.76314	4	2.5	0	
27	N27	-4.76314	4	-2.5	0	
28	N28	-4.76314	4	-7.5	0	
29	N29	-4.76314	-4	7.5	0	
30	N30	-4.76314	-4	2.5	0	
31	N31	-4.76314	-4	-2.5	0	
32	N32	-4.76314	-4	-7.5	0	
33	N33	8.87676	4	0.375	0	
34	N34	4.546633	4	2.875	0	
35	N35	0.216506	4	5.375	0	
36	N36	-4.113621	4	7.875	0	
37	N37	8.87676	-4	0.375	0	
38	N38	4.546633	-4	2.875	0	
39	N39	0.216506	-4	5.375	0	
40	N40	-4.113621	-4	7.875	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
41	N41	-4.76314	0	-7.5	0	
42	N42	-4.76314	0	-2.5	0	
43	N43	-4.76314	0	2.5	0	
44	N44	-4.76314	0	7.5	0	
45	N45	-4.113621	0	7.875	0	
46	N46	0.216506	0	5.375	0	
47	N47	4.546633	0	2.875	0	
48	N48	8.87676	0	0.375	0	
49	N49	-4.113621	3	-7.875	0	
50	N50	0.216506	3	-5.375	0	
51	N51	4.546633	3	-2.875	0	
52	N52	8.87676	3	-0.375	0	
53	N53	-4.76314	3	-7.5	0	
54	N54	-4.76314	3	-2.5	0	
55	N55	-4.76314	3	2.5	0	
56	N56	-4.76314	3	7.5	0	
57	N57	-4.113621	3	7.875	0	
58	N58	0.216506	3	5.375	0	
59	N59	4.546633	3	2.875	0	
60	N60	8.87676	3	0.375	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Y	-.066	7.5
2	M12	Y	-.066	7.5
3	M16	Y	-.066	7.5
4	M8	Y	-.066	2.5
5	M12	Y	-.066	2.5
6	M16	Y	-.066	2.5
7	M10	Y	-.052	7.5
8	M14	Y	-.052	7.5
9	M18	Y	-.052	7.5
10	M10	Y	-.052	4.5
11	M14	Y	-.052	4.5
12	M18	Y	-.052	4.5
13	M9	Y	-.077	7.5
14	M13	Y	-.077	7.5
15	M17	Y	-.077	7.5
16	M9	Y	-.077	.5
17	M13	Y	-.077	.5
18	M17	Y	-.077	.5
19	M9	Y	-.074	2
20	M13	Y	-.074	2

Member Point Loads (BLC 2 : Equipment Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
21	M17	Y	-.074	2
22	M9	Y	-.047	5
23	M13	Y	-.047	5
24	M17	Y	-.047	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Y	-.091	7.5
2	M12	Y	-.091	7.5
3	M16	Y	-.091	7.5
4	M8	Y	-.091	2.5
5	M12	Y	-.091	2.5
6	M16	Y	-.091	2.5
7	M10	Y	-.076	7.5
8	M14	Y	-.076	7.5
9	M18	Y	-.076	7.5
10	M10	Y	-.076	4.5
11	M14	Y	-.076	4.5
12	M18	Y	-.076	4.5
13	M9	Y	-.215	7.5
14	M13	Y	-.215	7.5
15	M17	Y	-.215	7.5
16	M9	Y	-.215	.5
17	M13	Y	-.215	.5
18	M17	Y	-.215	.5
19	M9	Y	-.072	2
20	M13	Y	-.072	2
21	M17	Y	-.072	2
22	M9	Y	-.054	5
23	M13	Y	-.054	5
24	M17	Y	-.054	5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	X	.03	7.5
2	M16	X	.03	7.5
3	M8	X	.03	2.5
4	M16	X	.03	2.5
5	M12	X	.04	7.5
6	M12	X	.04	2.5
7	M10	X	.017	7.5
8	M18	X	.017	7.5
9	M10	X	.017	4.5
10	M18	X	.017	4.5
11	M14	X	.034	7.5
12	M14	X	.034	4.5
13	M9	X	.049	7.5
14	M17	X	.049	7.5
15	M9	X	.049	.5
16	M17	X	.049	.5
17	M13	X	.11	7.5

Member Point Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
18	M13	X	.11	.5
19	M9	X	.019	2
20	M17	X	.019	2
21	M9	X	.012	5
22	M17	X	.012	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	X	.07	7.5
2	M16	X	.07	7.5
3	M8	X	.07	2.5
4	M16	X	.07	2.5
5	M12	X	.103	7.5
6	M12	X	.103	2.5
7	M10	X	.036	7.5
8	M18	X	.036	7.5
9	M10	X	.036	4.5
10	M18	X	.036	4.5
11	M14	X	.09	7.5
12	M14	X	.09	4.5
13	M9	X	.116	7.5
14	M17	X	.116	7.5
15	M9	X	.116	.5
16	M17	X	.116	.5
17	M13	X	.32	7.5
18	M13	X	.32	.5
19	M9	X	.041	2
20	M17	X	.041	2
21	M9	X	.021	5
22	M17	X	.021	5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Z	.04	7.5
2	M16	Z	.04	7.5
3	M8	Z	.04	2.5
4	M16	Z	.04	2.5
5	M12	Z	.03	7.5
6	M12	Z	.03	2.5
7	M10	Z	.034	7.5
8	M18	Z	.034	7.5
9	M10	Z	.034	4.5
10	M18	Z	.034	4.5
11	M14	Z	.017	7.5
12	M14	Z	.017	4.5
13	M9	Z	.11	7.5
14	M17	Z	.11	7.5
15	M9	Z	.11	.5
16	M17	Z	.11	.5
17	M13	Z	.049	7.5
18	M13	Z	.049	.5

Member Point Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
19	M13	Z	.019	2
20	M13	Z	.012	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Z	.103	7.5
2	M16	Z	.103	7.5
3	M8	Z	.103	2.5
4	M16	Z	.103	2.5
5	M12	Z	.07	7.5
6	M12	Z	.07	2.5
7	M10	Z	.09	7.5
8	M18	Z	.09	7.5
9	M10	Z	.09	4.5
10	M18	Z	.09	4.5
11	M14	Z	.036	7.5
12	M14	Z	.036	4.5
13	M9	Z	.32	7.5
14	M17	Z	.32	7.5
15	M9	Z	.32	.5
16	M17	Z	.32	.5
17	M13	Z	.116	7.5
18	M13	Z	.116	.5
19	M13	Z	.041	2
20	M13	Z	.021	5

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M15	X	.003	.003	0	0
2	M16	X	.003	.003	0	0
3	M17	X	.003	.003	0	0
4	M18	X	.003	.003	0	0
5	M7	X	.003	.003	0	0
6	M8	X	.003	.003	0	0
7	M9	X	.003	.003	0	0
8	M10	X	.003	.003	0	0
9	M19	X	.003	.003	0	0
10	M5	X	.003	.003	0	0
11	M11	X	.003	.003	0	0
12	M3	X	.003	.003	0	0
13	M1	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M15	X	.008	.008	0	0
2	M16	X	.008	.008	0	0
3	M17	X	.008	.008	0	0
4	M18	X	.008	.008	0	0
5	M7	X	.008	.008	0	0

Member Distributed Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
6	M8	X	.008	.008	0	0
7	M9	X	.008	.008	0	0
8	M10	X	.008	.008	0	0
9	M19	X	.008	.008	0	0
10	M5	X	.008	.008	0	0
11	M11	X	.008	.008	0	0
12	M3	X	.008	.008	0	0
13	M1	X	.008	.008	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M14	Z	.003	.003	0	0
2	M13	Z	.003	.003	0	0
3	M12	Z	.003	.003	0	0
4	M11	Z	.003	.003	0	0
5	M7	Z	.003	.003	0	0
6	M15	Z	.003	.003	0	0
7	M6	Z	.003	.003	0	0
8	M21	Z	.003	.003	0	0
9	M20	Z	.003	.003	0	0
10	M4	Z	.003	.003	0	0
11	M2	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M14	Z	.008	.008	0	0
2	M13	Z	.008	.008	0	0
3	M12	Z	.008	.008	0	0
4	M11	Z	.008	.008	0	0
5	M7	Z	.008	.008	0	0
6	M15	Z	.008	.008	0	0
7	M6	Z	.008	.008	0	0
8	M21	Z	.008	.008	0	0
9	M20	Z	.008	.008	0	0
10	M4	Z	.008	.008	0	0
11	M2	Z	.008	.008	0	0

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M2	Y	-.006	-.009	2	3.5
2	M2	Y	-.009	-.009	3.5	5
3	M2	Y	-.009	-.004	5	6.5
4	M2	Y	-.004	-.0003669	6.5	8
5	M6	Y	-.001	-.003	0	2.062
6	M6	Y	-.003	-.006	2.062	4.125
7	M6	Y	-.006	-.008	4.125	6.187
8	M6	Y	-.008	-.012	6.187	8.25
9	M6	Y	-.012	-.015	8.25	10.312
10	M6	Y	-.015	-.015	10.312	12.375
11	M6	Y	-.015	-.015	12.375	14.437

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
12	M6	Y	-.015	-.015	14.437	16.5
13	M3	Y	-.006	-.009	2	3.5
14	M3	Y	-.009	-.009	3.5	5
15	M3	Y	-.009	-.004	5	6.5
16	M3	Y	-.004	-.0003669	6.5	8
17	M4	Y	-.001	-.003	0	2.063
18	M4	Y	-.003	-.006	2.063	4.125
19	M4	Y	-.006	-.008	4.125	6.188
20	M4	Y	-.008	-.012	6.188	8.25
21	M4	Y	-.012	-.015	8.25	10.313
22	M4	Y	-.015	-.015	10.313	12.375
23	M4	Y	-.015	-.015	12.375	14.438
24	M4	Y	-.015	-.015	14.438	16.5
25	M1	Y	-.006	-.009	2	3.5
26	M1	Y	-.009	-.009	3.5	5
27	M1	Y	-.009	-.004	5	6.5
28	M1	Y	-.004	-.0003669	6.5	8
29	M5	Y	-.001	-.003	0	2.063
30	M5	Y	-.003	-.006	2.063	4.125
31	M5	Y	-.006	-.008	4.125	6.188
32	M5	Y	-.008	-.012	6.188	8.25
33	M5	Y	-.012	-.015	8.25	10.313
34	M5	Y	-.015	-.015	10.313	12.375
35	M5	Y	-.015	-.015	12.375	14.438
36	M5	Y	-.015	-.015	14.438	16.5

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Equipment Weight	None					24		3	
3	Ice Weight	None					24			
4	Wind w/ Ice X	None					22	13		
5	Wind X	None					22	13		
6	Wind w/ Ice Z	None					20	11		
7	Wind Z	None					20	11		
8	BLC 2 Transient Area Loads	None						36		

Load Combinations

	Description	Solve	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direc...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direc...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direc...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-direc...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	1.27	5	2.389	6	.992	1	-3.641	2	.553	4	-1.775	2
2		min	-1.27	1	1.011	2	-2.262	5	-8.49	6	-1.667	2	-4.912	6
3	N3	max	.079	6	2.379	3	.042	1	-.008	2	2.899	5	9.75	3
4		min	-2.525	2	1.091	5	-.914	5	-.518	4	-.29	2	4.429	5
5	N5	max	-.297	3	2.323	3	-.313	3	8.278	3	.791	2	-1.793	2
6		min	-1.293	4	.89	5	-2.481	4	2.825	5	.034	6	-4.67	6
7	Totals:	max	0	4	7.024	6	0	3						
8		min	-4.842	1	3.266	2	-5.642	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	-.012	3	-.485	2	-.007	3	5.575e-03	4	-7.541e-04	3	3.116e-03	6
4		min	-.257	4	-1.252	6	-.145	4	2.864e-03	2	-4.103e-03	4	-8.263e-04	2
5	N3	max	0	6	0	6	0	6	0	6	0	6	0	6
6		min	0	1	0	1	0	1	0	1	0	1	0	1
7	N4	max	.003	2	-.561	5	.111	4	3.931e-03	4	2.49e-03	5	-2.744e-03	5
8		min	0	6	-1.239	3	-.075	2	6.244e-05	2	1.33e-04	3	-5.994e-03	3
9	N5	max	0	6	0	6	0	6	0	6	0	6	0	6
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N6	max	.272	4	-.343	5	.079	2	1.143e-04	5	3.738e-03	2	2.571e-03	6
12		min	-.134	2	-1.183	3	-.154	5	-5.171e-03	3	-4.713e-03	4	-7.452e-04	2
13	N7	max	.151	4	-.322	5	.024	1	1.337e-04	5	3.76e-03	2	2.556e-03	6
14		min	-.038	2	-1.021	3	-.084	5	-5.145e-03	3	-4.713e-03	4	-7.564e-04	2
15	N8	max	.045	4	-.202	5	-.003	3	-3.854e-03	5	3.18e-04	2	7.54e-03	6
16		min	.006	3	-.595	3	-.024	5	-1.361e-02	3	-2.209e-03	4	2.146e-03	2
17	N9	max	.003	2	-.48	5	.185	4	3.931e-03	4	2.516e-03	5	-2.721e-03	5
18		min	0	6	-1.061	3	-.051	2	6.244e-05	2	1.33e-04	3	-5.964e-03	3
19	N10	max	.05	2	-.424	2	.027	2	5.549e-03	4	-7.593e-04	3	3.101e-03	6
20		min	-.151	4	-1.07	6	-.084	4	2.845e-03	2	-4.103e-03	4	-8.374e-04	2
21	N11	max	.002	2	-.277	5	.154	5	2.364e-03	4	7.091e-04	2	-7.209e-03	5
22		min	0	6	-.613	3	-.022	2	3.755e-05	2	-3.148e-03	4	-1.598e-02	3
23	N12	max	.067	2	-.25	2	.038	2	1.393e-02	6	1.198e-03	2	8.087e-03	6
24		min	-.052	4	-.618	6	-.028	4	6.195e-03	2	-2.271e-03	4	2.085e-03	2
25	N13	max	.127	4	-.314	5	-.003	3	7.045e-04	5	3.643e-03	2	1.071e-03	4
26		min	-.021	1	-.995	3	-.041	5	-3.727e-03	3	-5.963e-03	4	-1.501e-03	2
27	N14	max	.054	2	-.351	5	.315	4	2.992e-04	5	9.577e-04	2	-3.246e-04	5
28		min	-.077	4	-1.067	3	-.136	2	-1.351e-03	3	-5.238e-03	4	-2.391e-03	3
29	N15	max	.037	2	-.37	5	.391	4	2.125e-03	5	2.02e-03	4	8.291e-04	4
30		min	-.12	4	-1.048	3	-.108	2	-2.654e-03	3	-1.561e-03	2	-1.024e-03	2
31	N16	max	.001	2	-.445	5	.208	4	3.676e-03	5	3.335e-03	4	-1.756e-03	5
32		min	-.014	4	-1.023	3	-.047	2	-4.995e-04	3	1.397e-05	3	-3.961e-03	3
33	N17	max	.154	4	-.313	5	.175	4	4.99e-03	4	6.134e-03	1	-7.417e-04	5
34		min	.051	6	-.995	3	-.016	2	6.499e-04	2	-7.71e-03	4	-3.278e-03	1
35	N18	max	.25	1	-.351	5	.808	5	1.334e-02	5	9.934e-04	1	5.28e-03	4
36		min	-.227	5	-1.068	3	-.252	1	-3.12e-03	1	-6.912e-03	5	-3.966e-03	2
37	N19	max	.208	1	-.37	5	.83	5	1.093e-02	5	3.186e-03	5	4.003e-03	5
38		min	-.241	5	-1.048	3	-.176	1	-1.937e-03	1	-2.727e-03	1	-3.452e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
39	N20	max	.132	2	-.443	5	.466	5	4.503e-03	4	6.858e-03	4	1.565e-03	6
40		min	-.035	4	-1.024	3	-.045	2	1.032e-04	2	2.459e-04	3	-2.119e-03	2
41	N21	max	.178	4	-.314	5	.176	3	7.041e-04	5	3.643e-03	2	1.07e-03	4
42		min	-.045	2	-.995	3	-.075	5	-3.724e-03	3	-5.963e-03	4	-1.489e-04	2
43	N22	max	.464	2	-.351	5	1.366	4	-1.037e-03	2	9.577e-04	2	1.231e-02	2
44		min	-.122	6	-1.068	3	-.086	2	-3.082e-02	4	-5.238e-03	4	-2.053e-03	6
45	N23	max	.09	1	-.37	5	.387	4	2.883e-04	5	2.02e-03	4	1.602e-03	1
46		min	-.08	4	-1.048	3	-.04	2	-2.634e-03	3	-1.561e-03	2	6.702e-04	6
47	N24	max	-.098	5	-.445	5	.087	4	2.323e-03	5	3.335e-03	4	-1.756e-03	5
48		min	-.178	3	-1.023	3	-.029	2	-4.991e-04	3	1.397e-05	3	-3.642e-03	3
49	N25	max	.262	2	-.401	2	.095	5	3.151e-03	5	-1.169e-03	6	1.718e-04	5
50		min	-.123	5	-1.034	6	-.022	3	-1.693e-03	3	-6.819e-03	1	-3.667e-03	1
51	N26	max	.93	2	-.399	2	.097	5	3.362e-03	4	5.843e-04	4	6.402e-04	6
52		min	-.05	6	-1.074	6	.001	3	2.497e-04	3	-4.619e-03	2	-1.532e-02	2
53	N27	max	.739	2	-.396	2	.09	5	2.752e-03	5	6.954e-03	2	1.266e-03	4
54		min	-.086	4	-1.034	6	-.005	3	-3.206e-04	1	-4.96e-04	6	-1.088e-02	2
55	N28	max	.158	1	-.328	5	.113	4	4.832e-03	4	6.134e-03	1	-7.416e-04	5
56		min	.043	6	-.986	3	.012	3	6.498e-04	2	-7.71e-03	4	-3.207e-03	1
57	N29	max	.126	3	-.402	2	-.063	2	2.711e-03	4	-7.634e-04	6	2.791e-03	6
58		min	-.06	5	-1.034	6	-.23	4	1.865e-03	2	-4.394e-03	1	-9.172e-04	2
59	N30	max	1.505	1	-.399	2	.396	4	-4.718e-04	2	-8.23e-05	6	3.202e-02	1
60		min	.034	5	-1.074	6	.048	2	-1.376e-02	4	-3.247e-03	1	1.082e-03	5
61	N31	max	.386	1	-.396	2	.002	2	1.657e-03	3	4.543e-03	1	2.095e-03	6
62		min	.057	5	-1.034	6	-.089	4	-5.249e-04	5	-5.428e-04	5	7.755e-04	2
63	N32	max	.203	4	-.328	5	.147	3	-3.156e-04	5	4.819e-03	1	2.323e-03	6
64		min	.004	2	-.986	3	-.084	5	-2.982e-03	3	-4.007e-03	5	4.004e-04	2
65	N33	max	.143	2	-.483	5	.468	5	4.661e-03	4	6.858e-03	4	1.565e-03	6
66		min	-.01	6	-1.028	3	-.045	2	1.033e-04	2	2.459e-04	3	-2.191e-03	2
67	N34	max	.323	4	-.538	2	.962	4	1.442e-02	4	3.642e-03	1	-1.476e-03	3
68		min	.086	3	-1.082	6	.085	3	1.068e-03	3	9.265e-04	6	-5.854e-03	4
69	N35	max	.327	1	-.505	2	.698	4	1.013e-02	4	-1.61e-04	2	-8.97e-04	6
70		min	.054	6	-1.061	6	.098	3	1.199e-03	3	-8.596e-03	4	-3.952e-03	2
71	N36	max	.229	2	-.424	2	.137	5	3.079e-03	5	-1.169e-03	6	1.717e-04	5
72		min	-.148	5	-1.033	6	-.009	3	-1.693e-03	3	-6.819e-03	1	-3.51e-03	1
73	N37	max	-.072	5	-.482	5	.003	5	4.41e-03	4	3.486e-03	5	-1.797e-03	5
74		min	-.169	3	-1.028	3	-.072	1	4.869e-04	2	2.571e-04	3	-3.481e-03	3
75	N38	max	.545	2	-.538	2	1.335	5	2.633e-03	3	2.481e-03	2	1.338e-02	2
76		min	.021	6	-1.082	6	-.108	3	-2.849e-02	5	3.27e-04	6	-7.708e-04	4
77	N39	max	.104	2	-.504	2	.202	5	1.558e-03	1	-1.039e-04	3	1.526e-04	2
78		min	-.114	6	-1.061	6	-.02	3	1.071e-03	6	-5.493e-03	5	-2.647e-03	6
79	N40	max	.062	3	-.423	2	-.06	2	3.649e-03	6	-6.944e-04	3	1.302e-03	6
80		min	-.111	5	-1.033	6	-.228	4	2.289e-03	2	-5.115e-03	5	-3.073e-04	2
81	N41	max	.112	4	-.328	5	.024	1	1.036e-03	5	4.819e-03	1	2.325e-03	6
82		min	.001	2	-.986	3	-.084	5	-2.984e-03	3	-4.007e-03	5	-9.512e-04	2
83	N42	max	.342	1	-.396	2	.025	2	2.235e-03	4	4.543e-03	1	2.11e-03	6
84		min	-.009	5	-1.034	6	-.083	4	4.79e-04	2	-5.428e-04	5	-1.058e-03	2
85	N43	max	.396	1	-.399	2	.026	2	2.725e-04	5	-8.23e-05	6	2.224e-03	6
86		min	-.018	5	-1.074	6	-.083	4	-1.331e-03	3	-3.247e-03	1	7.876e-04	2
87	N44	max	.084	1	-.402	2	.027	2	4.065e-03	4	-7.634e-04	6	2.793e-03	6
88		min	-.117	5	-1.034	6	-.084	4	1.866e-03	2	-4.394e-03	1	-9.176e-04	2
89	N45	max	.063	2	-.423	2	.05	2	4.791e-03	4	-6.944e-04	3	1.303e-03	6
90		min	-.13	4	-1.033	6	-.047	4	2.29e-03	2	-5.115e-03	5	-1.659e-03	2

Envelope Joint Displacements (Continued)

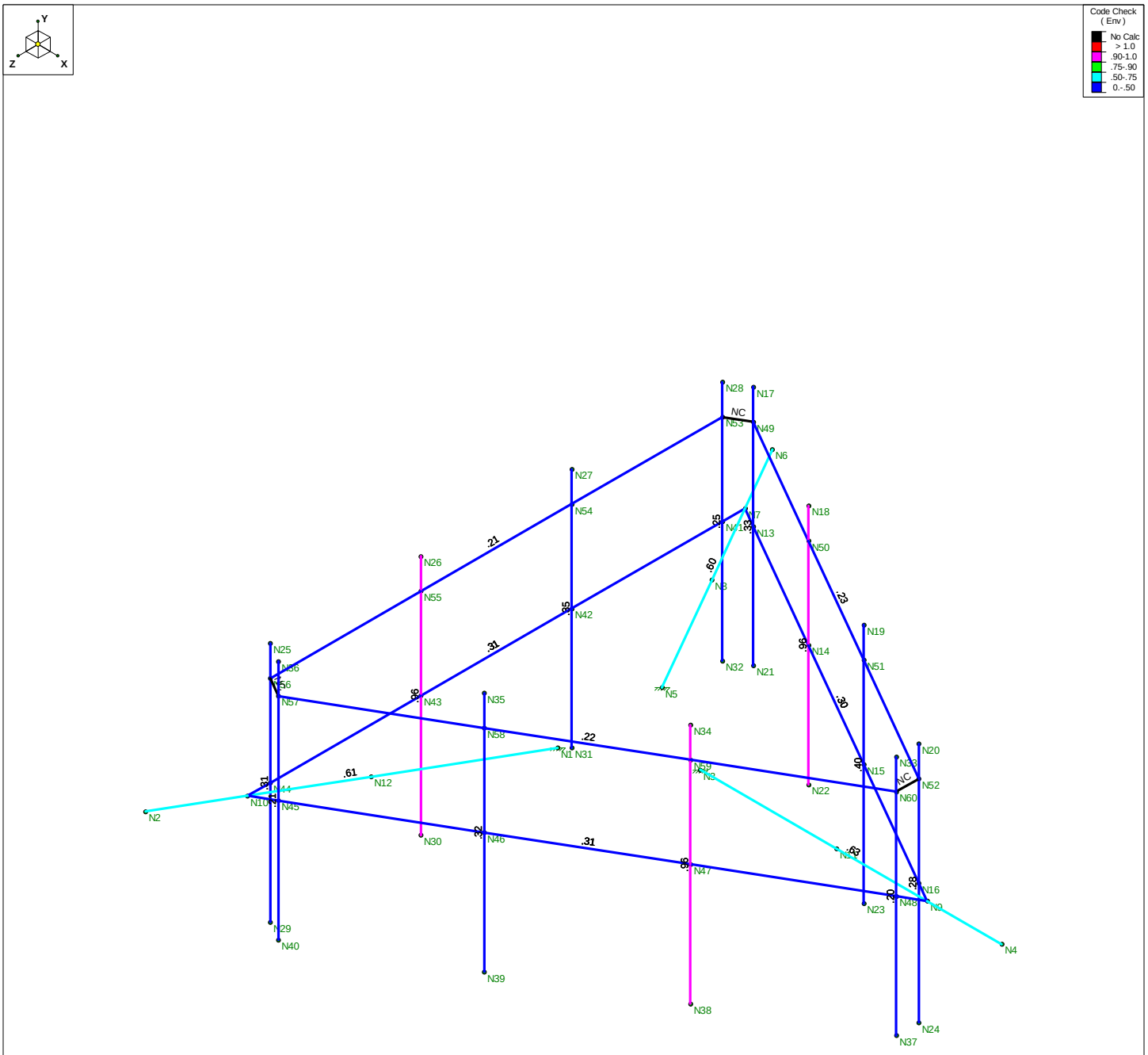
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
91	N46	max	.119	2	-.504	2	.276	5	3.331e-03	4	-1.039e-04	3	-1.704e-03	5
92		min	.013	6	-1.06	6	.032	3	1.083e-03	3	-5.493e-03	5	-2.816e-03	3
93	N47	max	.123	5	-.538	2	.396	5	2.959e-03	6	2.481e-03	2	-1.756e-05	3
94		min	.017	3	-1.081	6	.019	3	1.532e-03	2	3.27e-04	6	-7.769e-04	4
95	N48	max	.014	5	-.482	5	.209	5	4.413e-03	4	3.486e-03	5	-1.797e-03	5
96		min	.002	3	-1.028	3	-.042	1	4.871e-04	2	2.571e-04	3	-3.8e-03	3
97	N49	max	.143	4	-.313	5	.117	5	4.811e-03	4	6.134e-03	1	-7.416e-04	5
98		min	.035	6	-.995	3	-.024	1	6.498e-04	2	-7.71e-03	4	-3.186e-03	1
99	N50	max	.203	1	-.351	5	.649	5	1.271e-02	5	9.934e-04	1	5.279e-03	4
100		min	-.164	5	-1.067	3	-.215	1	-3.119e-03	1	-6.912e-03	5	-3.715e-03	2
101	N51	max	.167	1	-.37	5	.699	5	1.073e-02	5	3.186e-03	5	4.003e-03	5
102		min	-.193	5	-1.048	3	-.153	1	-1.936e-03	1	-2.727e-03	1	-3.292e-03	1
103	N52	max	.106	2	-.443	5	.412	5	4.482e-03	4	6.858e-03	4	1.565e-03	6
104		min	-.027	5	-1.024	3	-.046	2	1.032e-04	2	2.459e-04	3	-2.098e-03	2
105	N53	max	.12	2	-.328	5	.057	5	4.811e-03	4	6.134e-03	1	-7.416e-04	5
106		min	.028	6	-.986	3	-.002	3	6.498e-04	2	-7.71e-03	4	-3.186e-03	1
107	N54	max	.609	2	-.396	2	.057	5	2.591e-03	5	6.954e-03	2	1.266e-03	4
108		min	-.071	4	-1.034	6	-.002	3	-3.206e-04	1	-4.96e-04	6	-1.067e-02	2
109	N55	max	.747	2	-.399	2	.057	5	3.11e-03	4	5.843e-04	4	6.397e-04	6
110		min	-.043	6	-1.074	6	-.002	3	2.495e-04	3	-4.619e-03	2	-1.468e-02	2
111	N56	max	.219	2	-.401	2	.057	5	3.058e-03	5	-1.169e-03	6	1.717e-04	5
112		min	-.122	4	-1.034	6	-.001	3	-1.693e-03	3	-6.819e-03	1	-3.488e-03	1
113	N57	max	.188	2	-.424	2	.1	5	3.058e-03	5	-1.169e-03	6	1.717e-04	5
114		min	-.147	4	-1.033	6	.011	3	-1.693e-03	3	-6.819e-03	1	-3.488e-03	1
115	N58	max	.28	1	-.505	2	.577	4	9.92e-03	4	-1.61e-04	2	-8.966e-04	6
116		min	.043	6	-1.061	6	.084	3	1.198e-03	3	-8.596e-03	4	-3.792e-03	2
117	N59	max	.253	4	-.538	2	.79	4	1.378e-02	4	3.642e-03	1	-1.409e-03	3
118		min	.068	3	-1.082	6	.072	3	1.068e-03	3	9.265e-04	6	-5.853e-03	4
119	N60	max	.117	2	-.483	5	.412	5	4.482e-03	4	6.858e-03	4	1.565e-03	6
120		min	.009	6	-1.028	3	-.046	2	1.032e-04	2	2.459e-04	3	-2.098e-03	2

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
1	M1	HSS4X4X4	.613	0	6	.063	0	y	6	91.807	139....	16.181	16.181	1.8..	H1-...
2	M2	HSS4X4X4	.630	0	6	.076	0	y	4	91.807	139....	16.181	16.181	1.8..	H1-...
3	M3	HSS4X4X4	.602	0	3	.069	0	y	3	91.807	139....	16.181	16.181	1.8..	H1-...
4	M4	HSS4X4X4	.304	0	6	.065	0	y	3	44.947	139....	16.181	16.181	3.4..	H1-...
5	M5	HSS4X4X4	.306	0	3	.060	0	y	6	44.947	139....	16.181	16.181	3.3..	H1-...
6	M6	HSS4X4X4	.307	16.5	4	.067	0	y	6	44.947	139....	16.181	16.181	3.5..	H1-...
7	M7	PIPE_2.0	.284	4	4	.098	4		4	14.916	32.13	1.872	1.872	1.8..	H1-...
8	M8	PIPE_2.0	.398	4	4	.052	4		5	14.916	32.13	1.872	1.872	2.5..	H1-...
9	M9	PIPE_2.0	.964	4	5	.086	7		5	14.916	32.13	1.872	1.872	1.3..	H1-...
10	M10	PIPE_2.0	.334	4	4	.075	4		4	26.521	32.13	1.872	1.872	4.9..	H1-...
11	M11	PIPE_2.0	.252	4	1	.091	4		4	14.916	32.13	1.872	1.872	1.8..	H1-...
12	M12	PIPE_2.0	.353	4	1	.069	4		2	14.916	32.13	1.872	1.872	1.6..	H1-...
13	M13	PIPE_2.0	.960	4	1	.080	7		2	14.916	32.13	1.872	1.872	1.4..	H1-...
14	M14	PIPE_2.0	.305	4	1	.086	4		1	26.521	32.13	1.872	1.872	5	H1-...
15	M15	PIPE_2.0	.212	4	3	.091	4		1	14.916	32.13	1.872	1.872	1.6..	H1-...
16	M16	PIPE_2.0	.315	4	4	.087	4		4	14.916	32.13	1.872	1.872	2.1..	H1-...
17	M17	PIPE_2.0	.964	4	4	.075	7		4	14.916	32.13	1.872	1.872	1.4..	H1-...

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
18	M18	PIPE_2.0	.199	4	4	.097	4	5	26.521	32.13	1.872	1.872	4.9...	H1-...
19	M19	PIPE_2.0	.209	10	2	.150	15	2	4.372	32.13	1.872	1.872	3.7...	H1-...
20	M20	PIPE_2.0	.229	0	5	.135	0	5	4.372	32.13	1.872	1.872	2.1...	H1-...
21	M21	PIPE_2.0	.221	5	4	.148	0	4	4.372	32.13	1.872	1.872	2.2...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTFF001A - Mount	July 13, 2020 at 11:08 AM
20074.46	Unity Check	CTFF001A_AMA.R3D

EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTFF001A

FF001/Greenwich_Hospital
5 Perryridge Road
Greenwich, Connecticut 06830

July 27, 2020

EBI Project Number: 6220003396

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**41.07%**

July 27, 2020

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

Emissions Analysis for Site: CTFF001A - FF001/Greenwich_Hospital

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **5 Perryridge Road** in **Greenwich, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 5 Perryridge Road in Greenwich, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

8) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

9) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

11) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

12) The antennas used in this modeling are the Ericsson AIR6449 B41 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 2100 MHz / 1900 MHz / 1900 MHz channel(s) in Sector A, the Ericsson AIR6449 B41 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 2100 MHz / 1900 MHz / 1900 MHz channel(s) in Sector B, the Ericsson AIR6449 B41 for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 32 for the 2100 MHz / 1900 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value

is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

13) The antenna mounting height centerline of the proposed antennas is 144 feet above ground level (AGL).

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

15) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR6449 B41	Make / Model:	Ericsson AIR6449 B41	Make / Model:	Ericsson AIR6449 B41
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A1 MPE %:	**4.45%**	Antenna B1 MPE %:	**4.45%**	Antenna C1 MPE %:	**4.45%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 600 MHz / 600 MHz / 1900 MHz / 2100 MHz
Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 16.35 dBd	Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 16.35 dBd	Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A2 MPE %:	**2.89%**	Antenna B2 MPE %:	**2.89%**	Antenna C2 MPE %:	**2.89%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	2100 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	2100 MHz / 1900 MHz / 1900 MHz	Frequency Bands:	2100 MHz / 1900 MHz / 1900 MHz
Gain:	15.85 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.85 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.85 dBd / 15.35 dBd / 15.35 dBd
Height (AGL):	144 feet	Height (AGL):	144 feet	Height (AGL):	144 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts	Total TX Power (W):	360 Watts
ERP (W):	12,841.53	ERP (W):	12,841.53	ERP (W):	12,841.53
Antenna A3 MPE %:	**2.23%**	Antenna B3 MPE %:	**2.23%**	Antenna C3 MPE %:	**2.23%**

Site Composite MPE %	
Carrier	**MPE %**
T-Mobile (Max at Sector A):	9.57%
Eversource	20.44%
Verizon	1.89%
AT&T	5.87%
Sprint	0.34%
Clearwire	0.08%
Nextel	0.66%
Other Carriers	2.22%
Site Total MPE % :	41.07%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	9.57%
T-Mobile Sector B Total:	9.57%
T-Mobile Sector C Total:	9.57%
Site Total MPE % :	41.07%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE	2	6412.98	144.0	22.24	2500 MHz LTE	1000	2.22%
T-Mobile 2500 MHz NR	2	6412.98	144.0	22.24	2500 MHz NR	1000	2.22%
T-Mobile 700 MHz LTE	2	648.82	144.0	2.25	700 MHz LTE	467	0.48%
T-Mobile 600 MHz LTE	2	591.73	144.0	2.05	600 MHz LTE	400	0.51%
T-Mobile 600 MHz NR	1	1577.94	144.0	2.74	600 MHz NR	400	0.68%
T-Mobile 1900 MHz LTE	2	2203.69	144.0	7.64	1900 MHz LTE	1000	0.76%
T-Mobile 2100 MHz UMTS	2	1294.56	144.0	4.49	2100 MHz UMTS	1000	0.45%
T-Mobile 2100 MHz LTE	2	2307.55	144.0	8.00	2100 MHz LTE	1000	0.80%
T-Mobile 1900 MHz LTE	2	2056.61	144.0	7.13	1900 MHz LTE	1000	0.71%
T-Mobile 1900 MHz GSM	4	1028.30	144.0	7.13	1900 MHz GSM	1000	0.71%
						Total:	**9.57%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	9.57%
Sector B:	9.57%
Sector C:	9.57%
T-Mobile Maximum MPE % (Sector A):	9.57%
Site Total:	41.07%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **41.07%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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