



10 INDUSTRIAL AVE,  
SUITE 3  
MAHWAH NJ 07430

PHONE: 201.684.0055  
FAX: 201.684.0066

September 14, 2021

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

RE: Notice of Exempt Modification  
10 Willard Road, Norwalk, CT 06851  
Latitude: 41.12851800  
Longitude: -73.38993200  
T-Mobile Site#: CT11011D – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 262-foot level of the existing 350-foot lattice tower at 10 Willard Road, Norwalk, CT. The 350-foot lattice tower and property are owned by Willard Community Association LLC. 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 262-foot level of the tower.

**Planned Modifications:**

**Tower:**

Remove

(3) 1-5/8" Hybrid Cables

Remove and Replace:

(3) AIR 32 Antenna for (3) AIR 6449 B41 2500 MHz Antennas

Install New:

(3) RRU 4424

(3) Commscope SDX1926Q Diplexers

(3) 1-5/8" Hybrid Cables

Existing to Remain:

(3) APXVAARR24\_43-U-NA20 600/700/1900/2100 MHz Antennas

(3) AIR 3246 2100 MHz Antennas

(3) Radio 4449 B71B25

(3) TMA

(6) 1-5/8" Coax

(3) 1-5/8" Hybrid

**Ground:**

Install New: 6160 Cabinet and B160 Battery Cabinet

This facility was originally approved by the City of Norwalk with the condition that the facility area needs to be fenced-in. This proposed modification complies with the all previous approvals.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mayor -Harry Rilling, Elected Official, and Steven Kleppin, Director of Planning and Zoning for the City of Norwalk, 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](mailto:krichers@transcendwireless.com)

Attachments

cc: Harry Rilling – Mayor of City of Norwalk

Steven Kleppin– Director of Planning and Zoning for City of Norwalk

Willard Community Association LLC- Owner

## Kyle Richers

---

**From:** UPS <pkginfo@ups.com>  
**Sent:** Thursday, September 16, 2021 1:34 PM  
**To:** KRICHERS@TRANSCENDWIRELESS.COM  
**Subject:** UPS Delivery Notification, Tracking Number 1ZV257424298095475



**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 09/16/2021

**Delivery Time:** 1:32 PM

**Left At:** OFFICE

**Signed by:** JOE

### TRANSCEND WIRELESS

**Tracking Number:** [1ZV257424298095475](#)

**Ship To:** CITY OF NORWALK  
125 EAST AVENUE  
NORWALK, CT 06851  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** CT11011D CSC EO



[Download the UPS mobile app](#)

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## Kyle Richers

---

**From:** UPS <pkginfo@ups.com>  
**Sent:** Thursday, September 16, 2021 1:30 PM  
**To:** KRICHERS@TRANSCENDWIRELESS.COM  
**Subject:** UPS Delivery Notification, Tracking Number 1ZV257424290088461



**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 09/16/2021

**Delivery Time:** 1:27 PM

**Left At:** OFFICE

**Signed by:** KLEPPIN

### TRANSCEND WIRELESS

**Tracking Number:** [1ZV257424290088461](#)

**Ship To:** CITY OF NORWALK  
125 EAST AVENUE  
ROOM 129  
NORWALK, CT 06851  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** CT11011D CSC ZO



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## Kyle Richers

---

**From:** UPS <pkginfo@ups.com>  
**Sent:** Thursday, September 16, 2021 1:18 PM  
**To:** KRICHERS@TRANSCENDWIRELESS.COM  
**Subject:** UPS Delivery Notification, Tracking Number 1ZV257424294102455



**Hello, your package has been delivered.**

**Delivery Date:** Thursday, 09/16/2021

**Delivery Time:** 1:06 PM

**Left At:** RECEPTION

**Signed by:** REGUS INC

### TRANSCEND WIRELESS

**Tracking Number:** [1ZV257424294102455](#)

**Ship To:** WILLARD COMMUNITY ASSOCIATION LLC  
230 PARK AVENUE  
3RD FLOOR WEST  
NEW YORK, NY 10169  
US

**Number of Packages:** 1

**UPS Service:** UPS Ground

**Package Weight:** 1.0 LBS

**Reference Number:** CT11011D CSC OWNER



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# 10 WILLARD RD

**Location** 10 WILLARD RD

**Mblu** 5/ 17/ 2/ 0/

**Acct#** 11273

**Owner** WILLARD COMMUNITY ASSOCIATION LLC

**Assessment** \$4,691,645

**Appraisal** \$6,702,350

**PID** 11273

**Building Count** 3

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$2,533,050	\$4,169,300	\$6,702,350

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$1,773,135	\$2,918,510	\$4,691,645

## Owner of Record

**Owner** WILLARD COMMUNITY ASSOCIATION LLC  
**Co-Owner**  
**Address** C/O TVG PARTNERS LLC  
230 PARK AVE 3RD FLR WEST  
NEW YORK, NY 10169-0000

**Sale Price** \$0  
**Certificate**  
**Book & Page** 9057/59  
**Sale Date** 08/24/2020  
**Instrument** 25

## Ownership History

Ownership History					
Owner	Sale Price	Certificate	Book & Page	Instrument	Sale Date
WILLARD COMMUNITY ASSOCIATION LLC	\$0		9057/59	25	08/24/2020
FDSPIN WILLARD LLC	\$0		8711/260	25	07/18/2018
FDSPIN WILLARD LLC	\$6,625,000		8554/113	00	07/11/2017
SOUTHERN NEW ENG TEL CO	\$0		401/370		03/10/1954

## Building Information

### Building 1 : Section 1

**Year Built:** 1956  
**Living Area:** 46,692

Replacement Cost: \$1,939,170

Building Percent Good: 77

Replacement Cost

Less Depreciation: \$1,493,160

**Building Attributes**

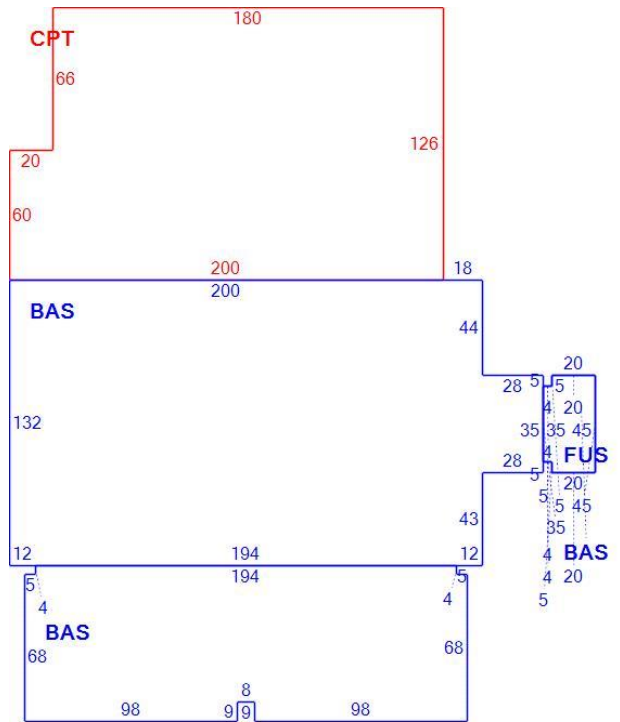
Field	Description
STYLE	Warehouse
MODEL	Industrial
Grade	C
Stories:	1.00
Occupancy	2.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	Minimum
Interior Floor 1	Concrete
Interior Floor 2	Vinyl
Heating Fuel	Oil
Heating Type	Forced Air
AC Percent	35
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
Full Baths	0
Half Baths	2
Extra Fixtures	0
FBM Area	
Heat/AC	Heat/AC Split
Frame	Steel
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	12.00
% Sprinkler	65.00

**Building Photo**



(<http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\31\78.jpg>)

**Building Layout**



(ParcelSketch.aspx?pid=11273&bid=11273)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	45,652	45,652
FUS	Finished Upper Story	1,040	1,040
CPT	Carport	23,880	0
		70,572	46,692

**Building 2 : Section 1**

Year Built: 1972

Living Area: 988

Replacement Cost: \$111,960

Building Percent Good: 77

Replacement Cost

Less Depreciation: \$86,210

Building Attributes : Bldg 2 of 3

Field	Description
STYLE	Commercial
MODEL	Industrial
Grade	C
Stories:	1.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
Full Baths	0
Half Baths	0
Extra Fixtures	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Light
Wall Height	12.00
% Sprinkler	0.00

Building 3 : Section 1

Year Built: 1988

Living Area: 560

Replacement Cost: \$43,126

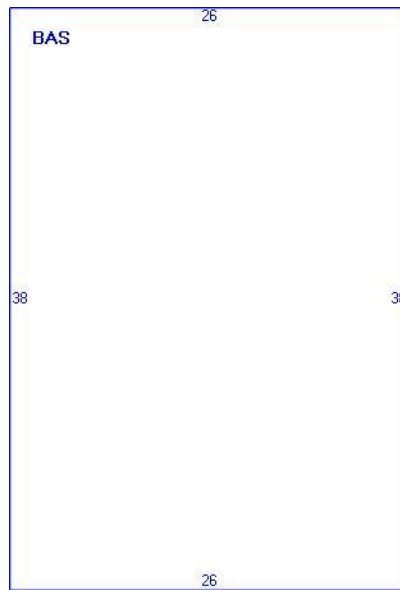
Building Percent Good: 82

Building Photo



(http://images.vgsi.com/photos/NorwalkCTPhotos/default.jpg)

Building Layout



(ParcelSketch.ashx?pid=11273&bid=50568)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	988	988
		988	988



**Replacement Cost**

**Less Depreciation:** \$35,360

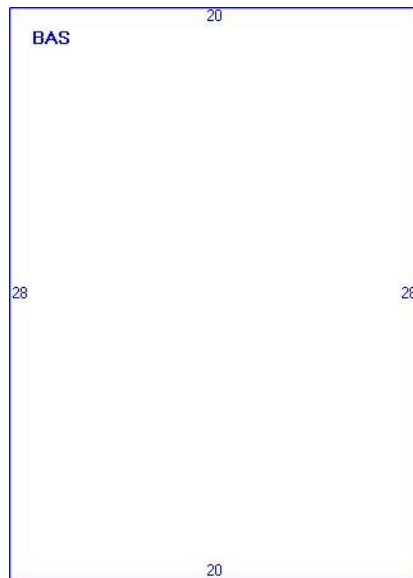
Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Telephone Bldg
MODEL	Industrial
Grade	C
Stories:	1.00
Occupancy	1.00
Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
Full Baths	0
Half Baths	0
Extra Fixtures	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	
% Sprinkler	0.00

**Building Photo**



(<http://images.vgsi.com/photos/NorwalkCTPhotos//default.jpg>)

**Building Layout**



(ParcelSketch.ashx?pid=11273&bid=50569)

Building Sub-Areas (sq ft)			<u>Legend</u>
Code	Description	Gross Area	Living Area
BAS	First Floor	560	560
		560	560

**Extra Features**

Extra Features	<u>Legend</u>
No Data for Extra Features	

**Land****Land Use**

**Use Code** 401  
**Description** Utility  
**Zone** B2  
**Neighborhood** C330

**Land Line Valuation**

**Size (Acres)** 8.29  
**Frontage**  
**Depth**  
**Assessed Value** \$2,918,510  
**Appraised Value** \$4,169,300

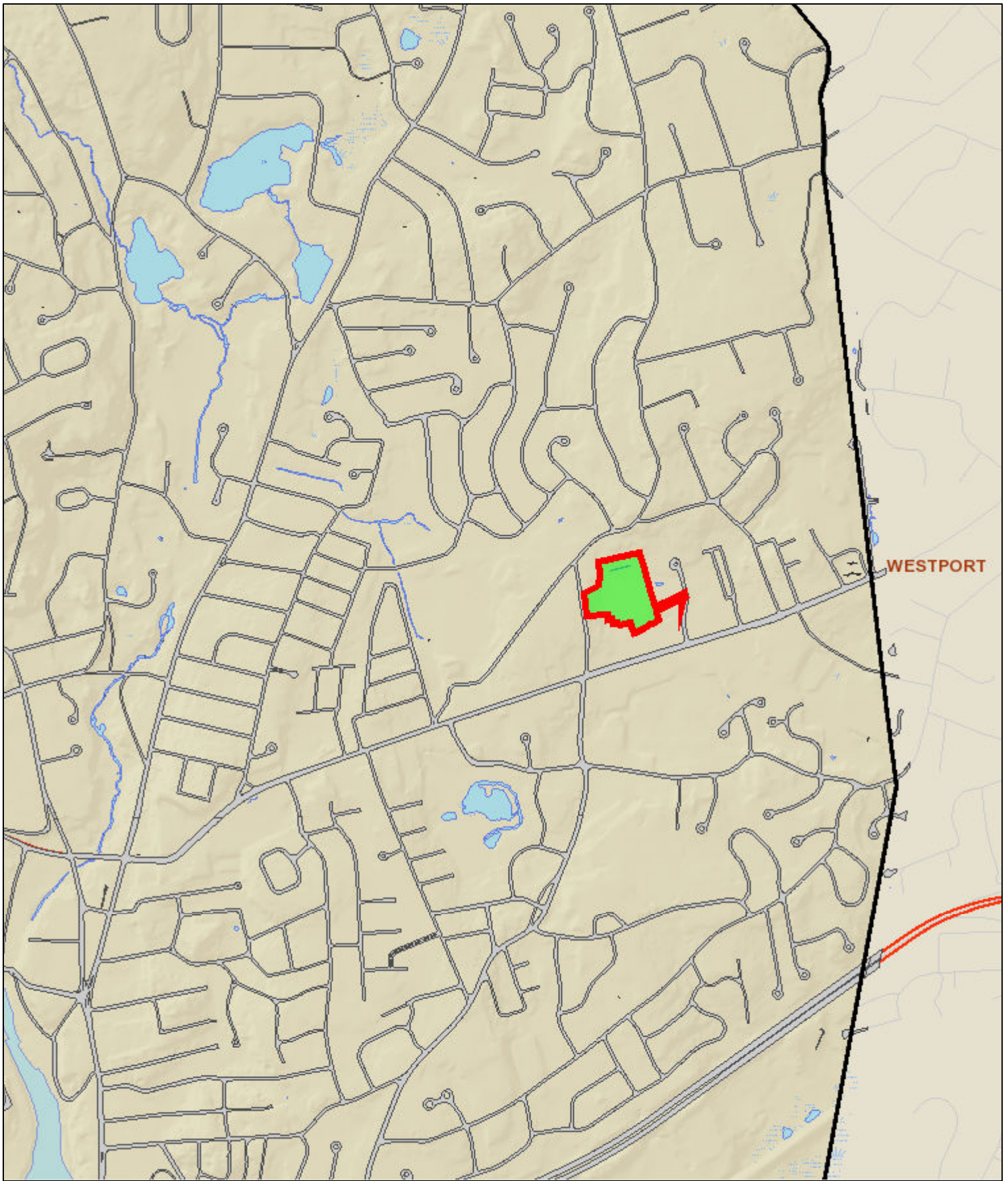
**Outbuildings**

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving Asph.			12000.00 S.F.	\$15,600	1
PAV1	Paving Asph.			60300.00 S.F.	\$78,390	1
FN6	Fence 6'			3000.00 L.F.	\$27,270	1
TNK1	Tank Under Grn			10000.00 GALS	\$10,000	1
CEL1	Cell Tower		Steel	1.00 UNITS	\$150,000	1

**Valuation History**

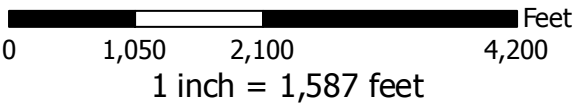
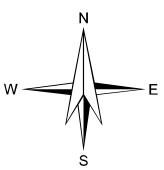
Appraisal			
Valuation Year	Improvements	Land	Total
2019	\$2,533,050	\$4,169,300	\$6,702,350
2018	\$2,533,050	\$4,169,300	\$6,702,350
2017	\$1,175,000	\$4,493,250	\$5,668,250

Assessment			
Valuation Year	Improvements	Land	Total
2019	\$1,773,135	\$2,918,510	\$4,691,645
2018	\$1,773,135	\$2,918,510	\$4,691,645
2017	\$822,500	\$3,145,280	\$3,967,780



WESTPORT

**CT11011D**



# T-Mobile

## WIRELESS COMMUNICATIONS FACILITY

WESTPORT-SNET LL  
 SITE ID: CT11011D  
 10 WILLARD ROAD  
 NORWALK, CT 06851

### T-MOBILE RF CONFIGURATION

67D5993M\_2xAIR+1OP

### GENERAL NOTES

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE IA/EIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES. 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

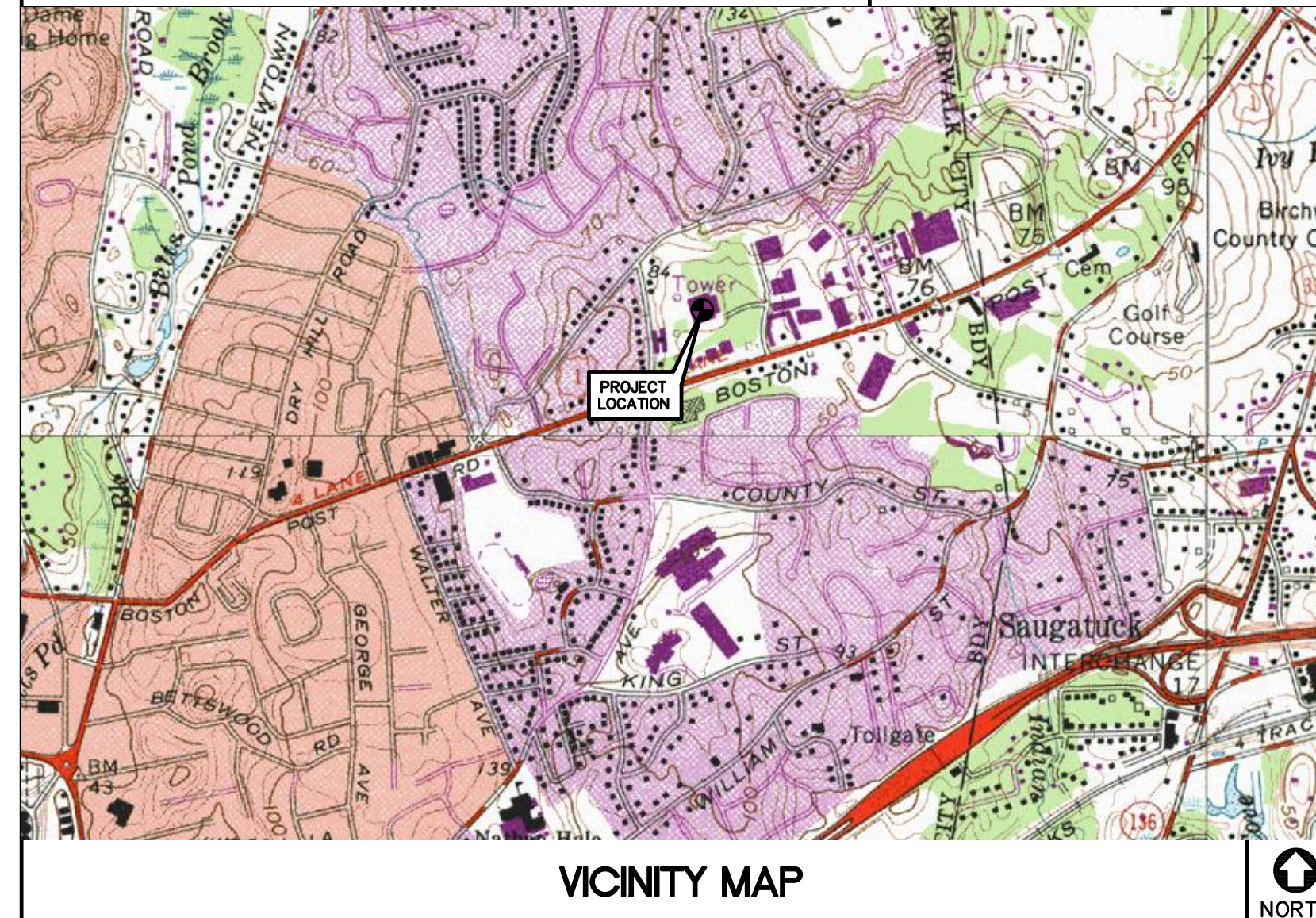
### SITE DIRECTIONS

**FROM:** 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 **TO:** 10 WILLARD ROAD NORWALK, CT 06851

- HEAD NORTH ON GRIFFIN RD S 0.30 MI.
- TURN RIGHT ONTO DAY HILL RD 3.60 MI.
- USE THE RIGHT LANE TO MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD 0.40 MI.
- MERGE ONTO I-91 S 26.0 MI.
- TAKE EXIT 17 TO MERGE ONTO CT-15 S/WILBUR CROSS PKWY 44.2 MI.
- TAKE EXIT 41 TOWARD WILTON RD. 0.10 MI.
- TURN RIGHT ONTO WILTON RD 1.90 MI.
- TURN RIGHT ONTO US-1 S/POST RD 1.60 MI.
- TURN RIGHT ONTO WILLARD RD 0.80 MI.
- TURN LEFT, TURN RIGHT, TURN LEFT, TURN LEFT 0.10 MI.
- DESTINATION WILL BE ON THE LEFT

**SITE COORDINATES:** LATITUDE: 41°-7'-41.47" N  
 LONGITUDE: 73°-23'-24.58" W  
 GROUND ELEVATION: 53± AMSL

**COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH**



### PROJECT SUMMARY

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

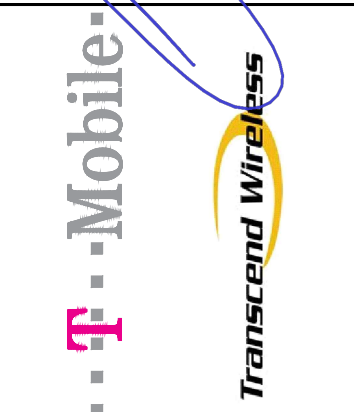
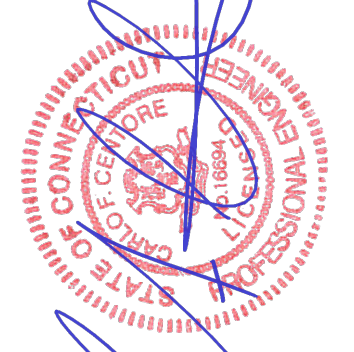
- INSTALL (1) ENCLOSURE 6160
- INSTALL (1) BATTERY CABINET B6160
- ADD (1) IXRE ROUTER, (1) BB6630 FOR L2500, (1) BB6648 FOR N2500 TO NEW ENCLOSURE 6160
- ADD (3) HYBRID CABLES. THERE WILL BE A TOTAL OF (6) 6X12 HYBRID CABLES AT THE SITE (2) 6X12 HYBRID CABLES PER SECTOR. DC AND FIBER TO BE REALLOCATED AMONG A&L EQUIPMENT. LENGTH OF NEW HYBRID CABLES TO BE DETERMINED
- 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 4424 B25 FOR L1900 (BOTH CARRIERS) AND GSM TO POSITION 2 NEAR ANTENNA, AND CONNECT ITS PORTS TO THE FOUR PCS INPUT PORTS OF THE DIPLEXER.
- INSTALL DUAL SWIVEL MOUNT KIT, TYP. (1) PER SECTOR
- INSTALL COMMSCOPE DIPLEXER (1) PER SECTOR, TOTAL OF (3).

### PROJECT INFORMATION

**SITE NAME:** WESTPORT-SNET LL  
**SITE ID:** CT11011D  
**SITE ADDRESS:** 10 WILLARD ROAD NORWALK, CT 06851  
**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°-7'-41.47" N  
 LONGITUDE: 73°-23'-24.58" W  
 GROUND ELEVATION: 53± AMSL  
 SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

### SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	GENERAL NOTES AND SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND PLAN AND ELEVATION	0
C-3	EQUIPMENT PLAN	0
C-4	ANTENNA PLAN	0
C-5	ANTENNA ELEVATIONS	0
C-6	TYPICAL DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS	0



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

**T-MOBILE NORTHEAST LLC**  
 WIRELESS COMMUNICATIONS FACILITY  
**WESTPORT-SNET LL**  
**SITE ID: CT11011D**  
 10 WILLARD ROAD  
 NORWALK CT, 06851

**DATE:** 07/23/20  
**SCALE:** AS NOTED  
**JOB NO.** 20074.64

**TITLE SHEET**

**T-1**  
 Sheet No. 1 of 9

REV.	DATE	BY	DESCRIPTION
0	08/12/20	RTS	ISSUED FOR CONSTRUCTION
		TJR	DRAWN BY
		CHK'D BY	DESCRIPTION

**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 III (BASED ON IBC TABLE 1604.5)
  - NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH ( $V_{asd}$ ) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

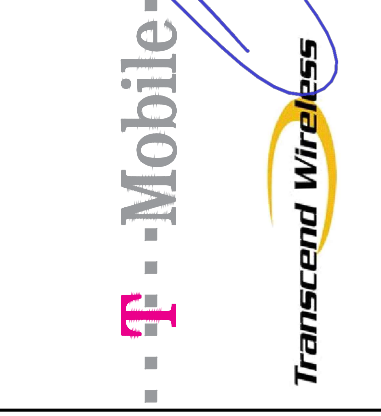
**SITE NOTES**

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**

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 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 IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "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.

REV.	DATE	BY	DESCRIPTION
0	08/12/20	RTS	ISSUED FOR CONSTRUCTION
		TJR	CONSTRUCTION DRAWINGS -
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 WIRELESS COMMUNICATIONS FACILITY  
**WESTPORT-SNET LL**  
**SITE ID: CT11011D**  
 10 WILLARD ROAD  
 NORWALK CT, 06851

DATE: 07/23/20  
 SCALE: AS NOTED  
 JOB NO. 20074.64

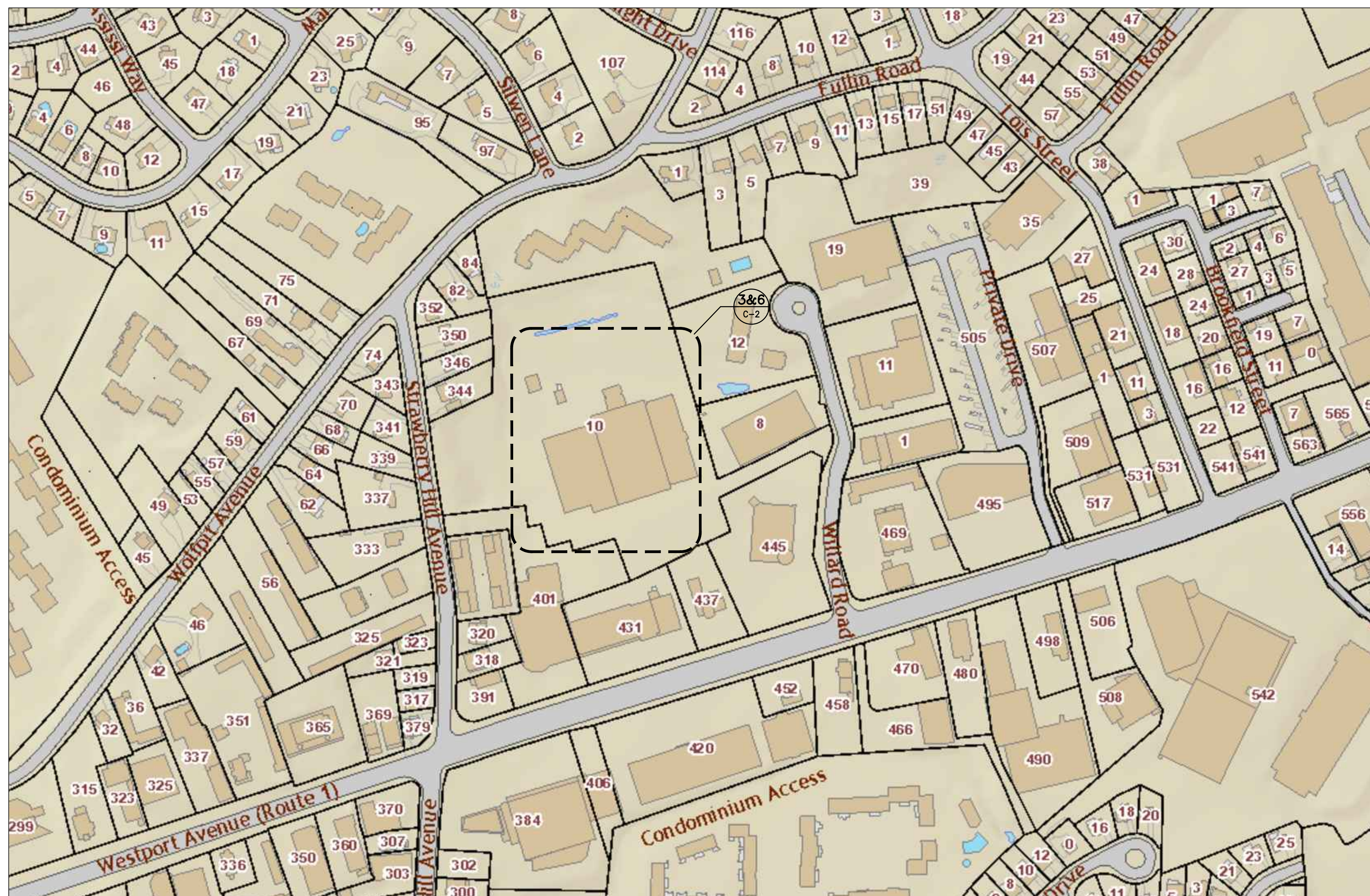
GENERAL NOTES AND SPECIFICATIONS

**N-1**

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 $\phi$ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA/DIPLEXER (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	262'	0°			(1) 6x12 HYBRID CABLE ( $\pm$ 290'L)
A2	EXISTING	RFS (APXVAARR24_43-U-N-NA20)	95.9 x 24.0 x 8.7	262'	0°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)	(E) GENERIC TWIN STYLE 1B (1), (P) COMMSCOPE SDX1926Q-43 (1)	
A3	EXISTING	ERICSSON (AIR3246 B66)	58.1 x 15.8 x 9.4	262'	0°			
B1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	262'	120°			(1) 6x12 HYBRID CABLE ( $\pm$ 290'L)
B2	EXISTING	RFS (APXVAARR24_43-U-N-NA20)	95.9 x 24.0 x 8.7	262'	120°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)	(E) GENERIC TWIN STYLE 1B (1), (P) COMMSCOPE SDX1926Q-43 (1)	
B3	EXISTING	ERICSSON (AIR3246 B66)	58.1 x 15.8 x 9.4	262'	120°			
C1	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	262'	240°			(1) 6x12 HYBRID CABLE ( $\pm$ 290'L)
C2	EXISTING	RFS (APXVAARR24_43-U-N-NA20)	95.9 x 24.0 x 8.7	262'	240°	(E) RRU 4449 B71+B85 (1), (P) RRU 4424 B25 (1)	(E) GENERIC TWIN STYLE 1B (1), (P) COMMSCOPE SDX1926Q-43 (1)	
C3	EXISTING	ERICSSON (AIR3246 B66)	58.1 x 15.8 x 9.4	262'	240°			



1 SITE LOCATION PLAN  
C-1 SCALE: NOT TO SCALE



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SITE LOCATION AND ANTENNA SCHEDULE

C-1

Sheet No. 3 of 9

REV. DATE DESCRIPTION  
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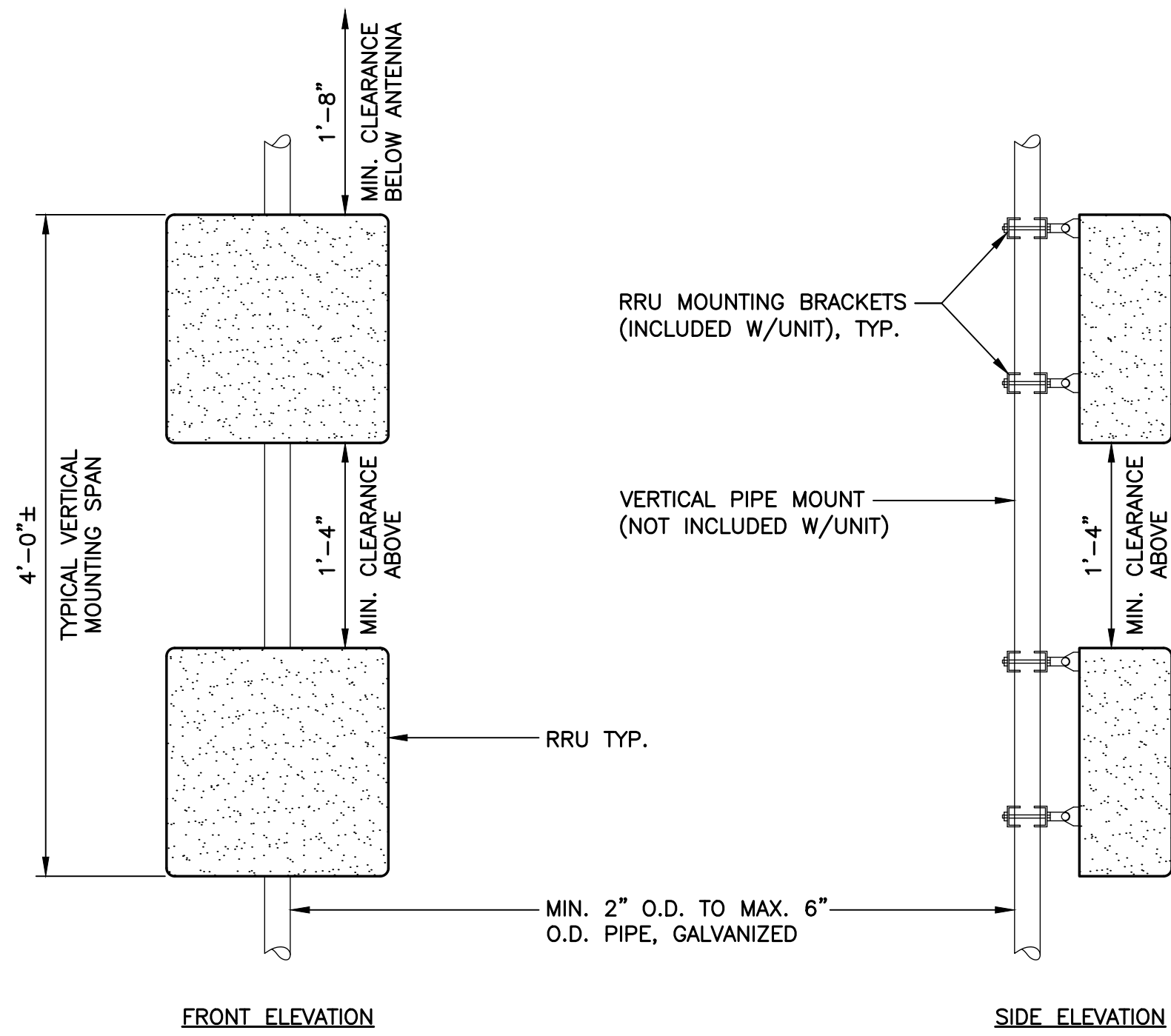












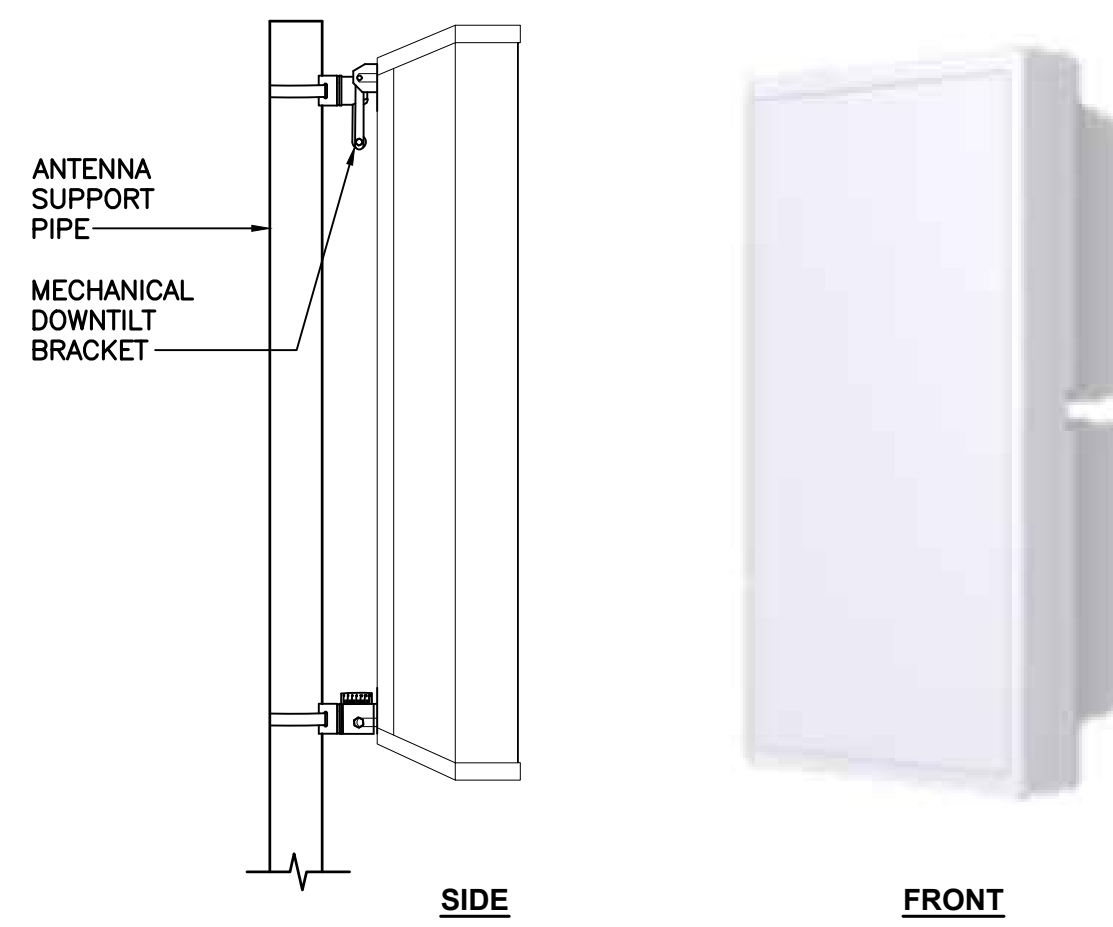
FRONT ELEVATION

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 TYPICAL RRU'S MOUNTING DETAILS**  
C-6 SCALE: NOT TO SCALE

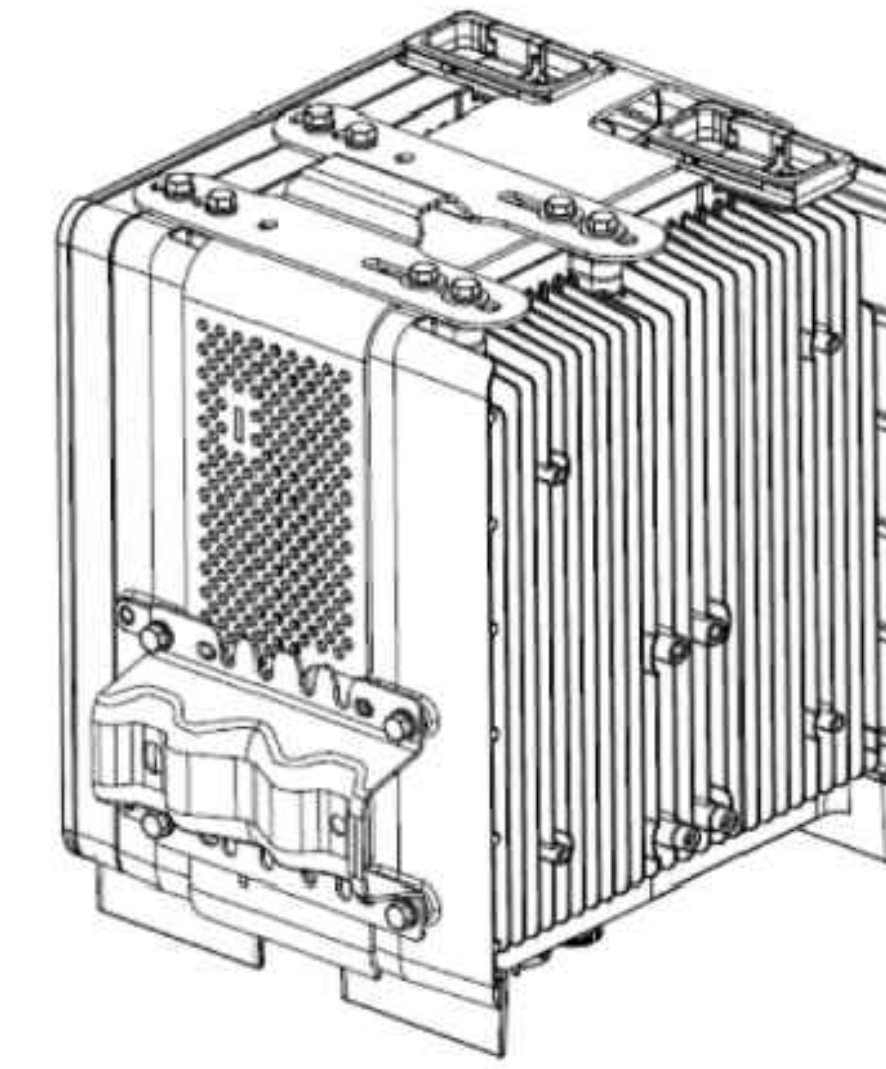


SIDE

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

**2 PROPOSED ANTENNA DETAIL**  
C-6 SCALE: NOT TO SCALE



FRONT VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4424 B25	17.1"L x 14.4"W x 11.3"D	±86 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
<b>NOTES:</b> 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

**3 PROPOSED RRU DETAIL**  
C-6 SCALE: NOT TO SCALE



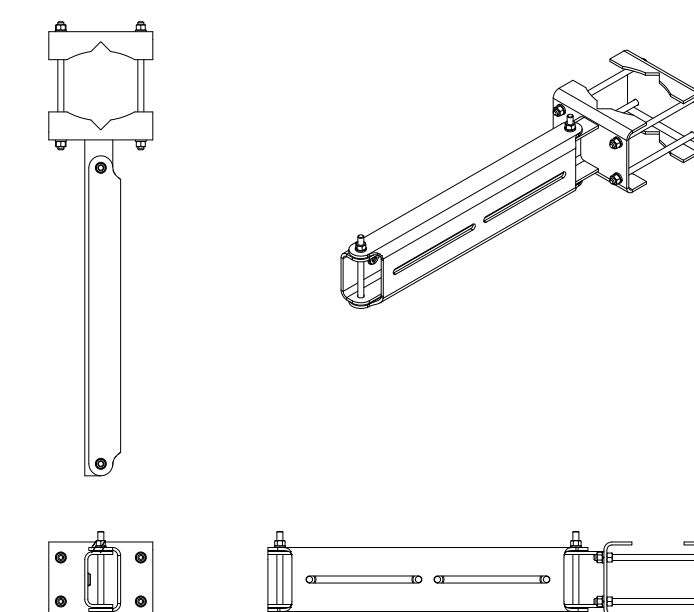
EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

**4 ENCLOSURE 6160 (OUTDOOR)**  
C-6 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 BATTERY CABINET DETAIL**  
C-6 NOT TO SCALE



RRU DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

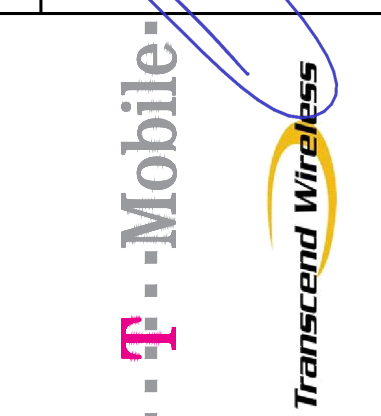
**6 RRU DUAL SWIVEL MOUNT DETAIL**  
C-6 SCALE: NOT TO SCALE



DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: SDX1926Q-43(E14F05P86)	4.2"L x 7.0"W x 3.0"D	-
<b>NOTES:</b> 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T-MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

**7 PROPOSED DIPLEXER DETAIL**  
C-6 SCALE: NOT TO SCALE

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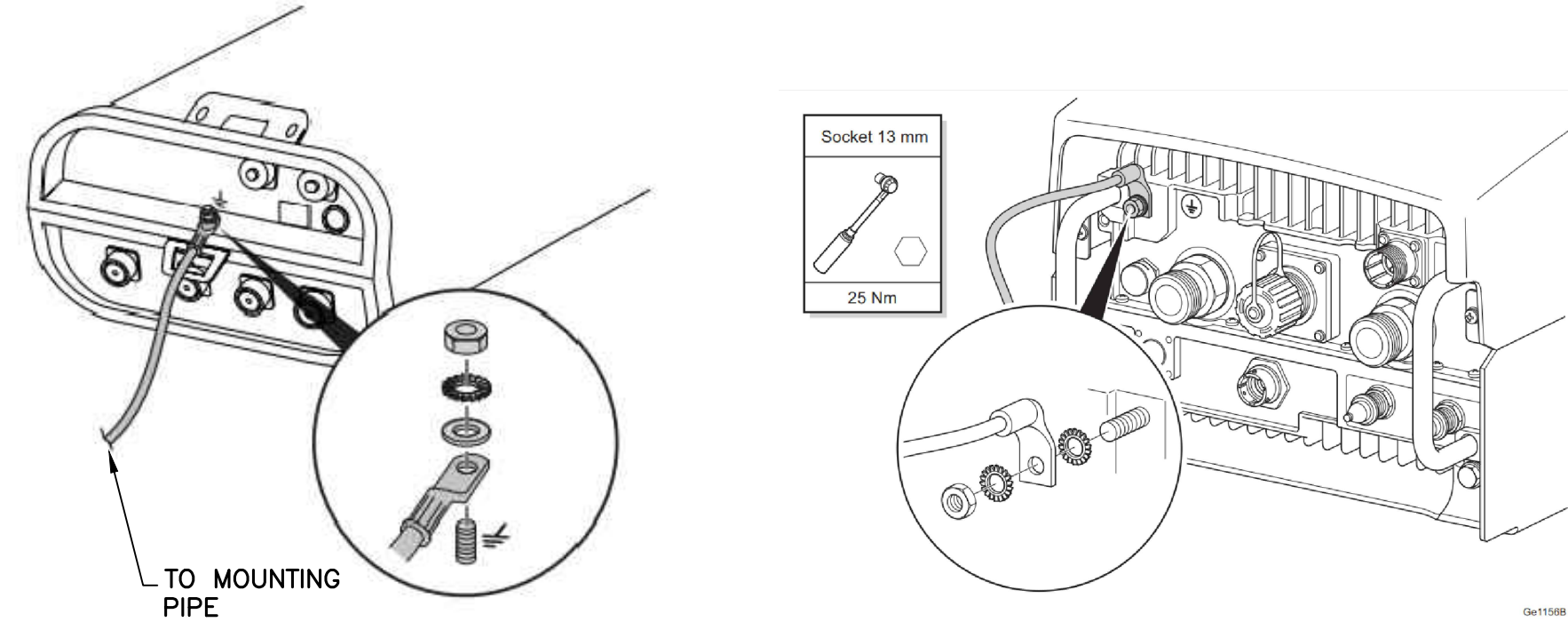
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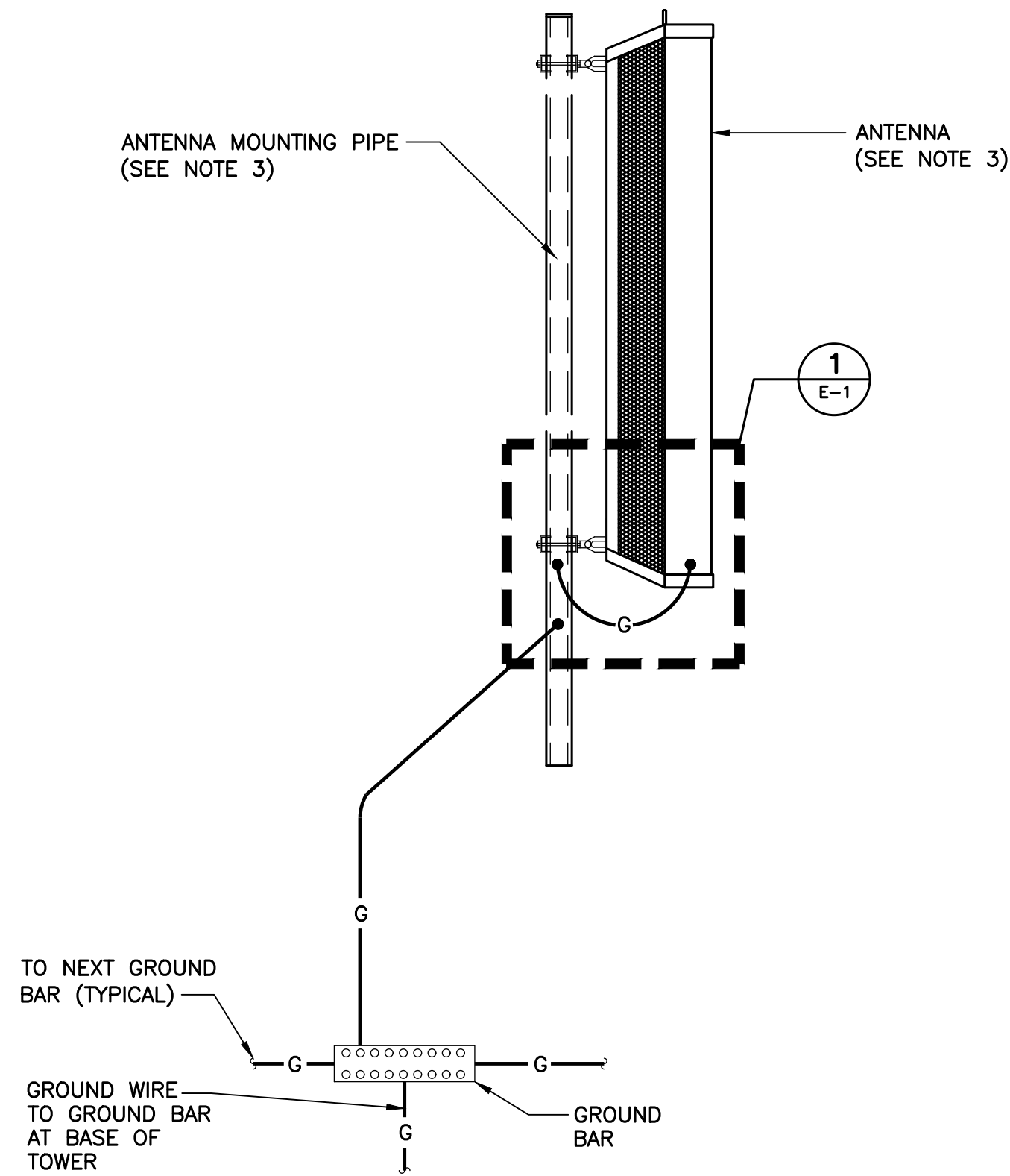
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TYPICAL EQUIPMENT DETAILS

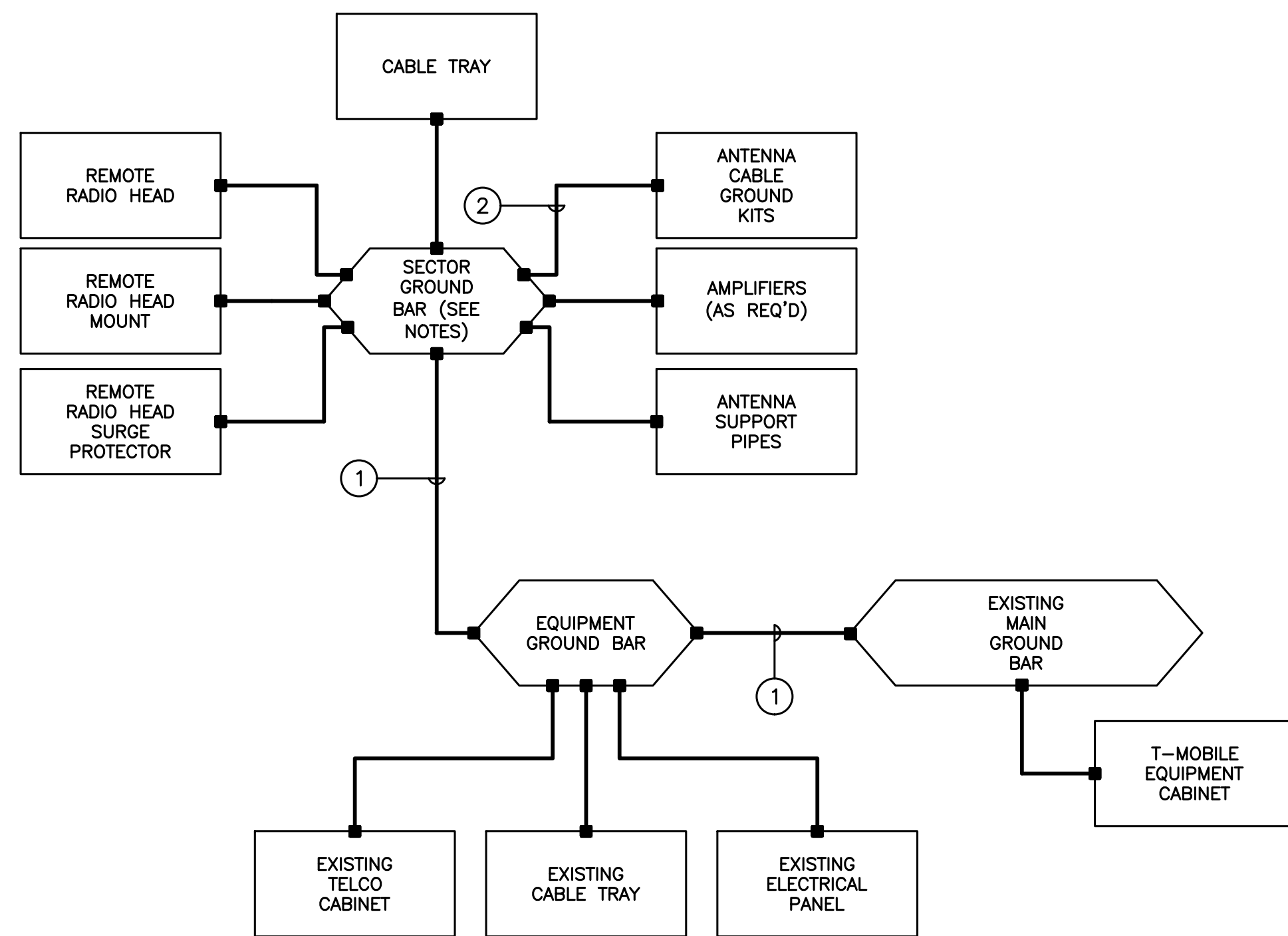
**C-6**  
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**1 TYPICAL ANTENNA/RRU GROUNDING DETAILS**  
E-1 SCALE: NOT TO SCALE

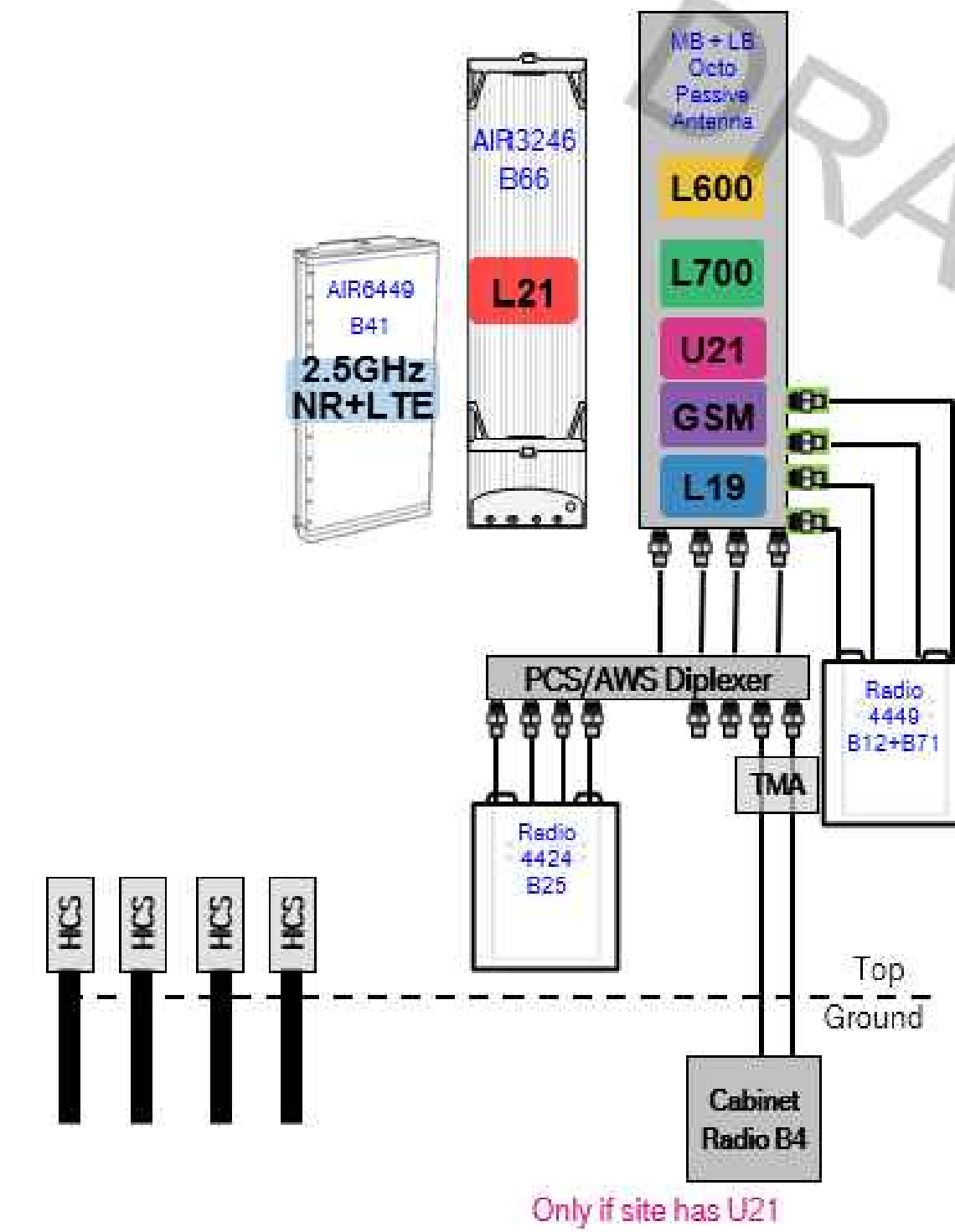


- NOTES:**
1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
  2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
  3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.



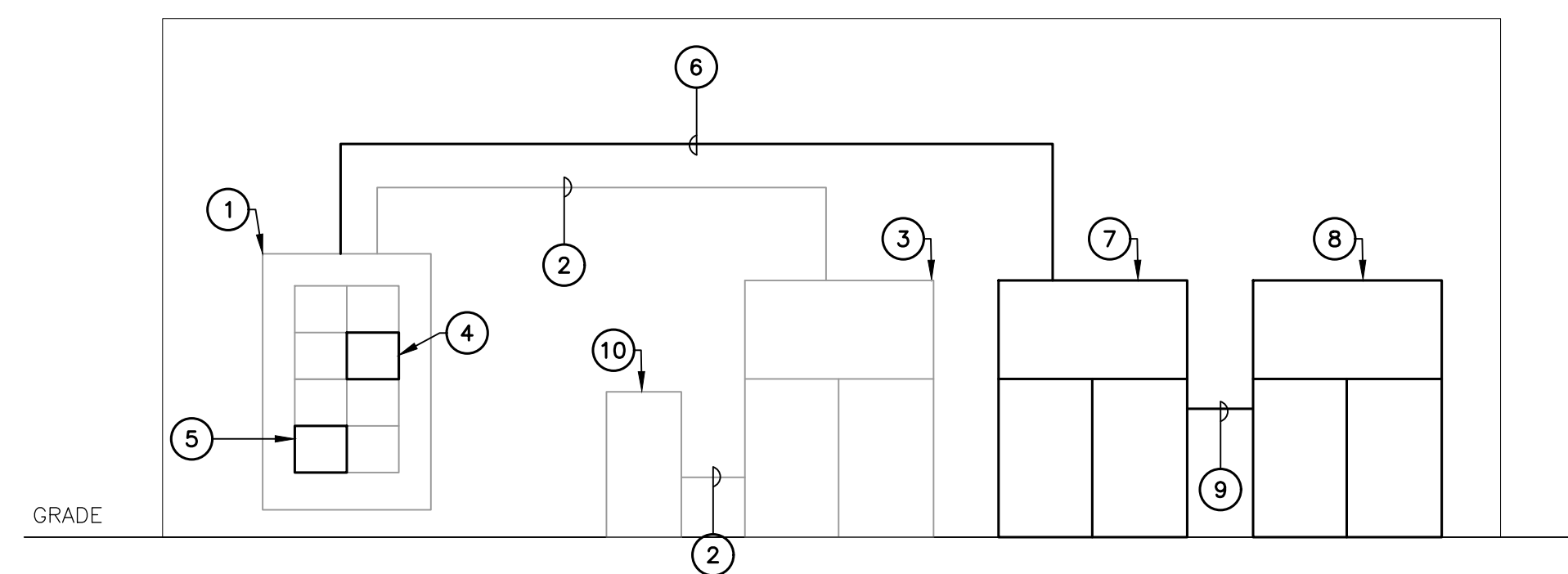
- GROUNDING SCHEMATIC NOTES**
- 1 #2 AWG
  - 2 #6 AWG
- GENERAL NOTES:**
1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
  2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW - EXTERIOR; STRANDED GREEN 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 TOWER MOUNTED EQUIPMENT WITH OWNER.
  6. ALL TOWER 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 TYPICAL GROUNDING SCHEMATIC DETAIL**  
E-1 SCALE: NOT TO SCALE



**3 PROPOSED PLUMBING DIAGRAM**  
E-1 SCALE: NOT TO SCALE

- RISER DIAGRAM NOTES**
- 1 EXISTING 200A, 120/240V, SINGLE PHASE PANEL TO REMAIN.
  - 2 EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
  - 3 EXISTING EQUIPMENT CABINET TO REMAIN.
  - 4 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.
  - 5 NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
  - 6 (3) #1 AWG, (1) #8 AWG GROUND, 1-1/2" CONDUIT.
  - 7 NEW RADIO EQUIPMENT CABINET.
  - 8 NEW BATTERY CABINET.
  - 9 DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
  - 10 EXISTING BBU CABINET.



**5 ELECTRICAL POWER RISER DIAGRAM**  
E-1 SCALE: NOT TO SCALE

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TYPICAL ELECTRICAL DETAILS

**E-1**

Sheet No. 9 of 9

CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION  
TJR  
DRAWN BY/CHK'D BY  
DATE 08/12/20  
REV.

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# Rigorous Structural Analysis Report

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**T-Mobile | Norwalk Willard Rd Site | #CT11011D**  
**Owner: CCT-4, LLC | Norwalk Site**  
**Norwalk, Connecticut**

**July 31, 2020**

**MEI PROJECT ID: CT04761S-20V1**



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17950 PRESTON ROAD, SUITE 720 ■ DALLAS, TEXAS 75252 ■ TEL. 972-783-2578 FAX 972-783-2583  
[www.maloufengineering.com](http://www.maloufengineering.com)

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July 31, 2020

Mr. Dan Reid  
**Transcend Wireless**  
 Mahwah, NJ 07430

### RIGOROUS STRUCTURAL ANALYSIS

Structure/Make/Model:	351.67 ft <b>Self-Supporting Tower</b>	Not Known / Not Known	
Client/Site Name/#:	<b>Transcend Wireless / T-Mobile</b>	<b>Norwalk Willard Rd   CT11011D</b>	
Owner/Site Name/#:	CCT-4, LLC	Norwalk	
MEI Project ID:	<b>CT04761S-20V1</b>		
Location:	10 Willard Rd Norwalk, Connecticut 06851	Fairfield County FCC #1046320	
	LAT      41-07-41.8 N	LON      73-23-24.9 W	

**EXECUTIVE SUMMARY:**

Malouf Engineering Int'l (MEI), as requested, has performed a rigorous structural analysis of the above-mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA-222-G Standard for the loading considered under the criteria listed and referenced in the report sections – tower rated at 98.0% - Sub Bracing.

**The installation of the proposed changed condition as noted in Table 1 is structurally acceptable.** Please refer to Appendix 1 for Schematic Lines Layout.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects, please contact us.

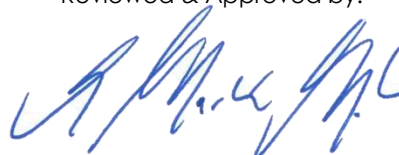
Respectfully submitted,

**MALOUF ENGINEERING INT'L, INC.**

Analysis performed by:

Reviewed & Approved by:

Krishna Manda, PE  
 Sr. Project Engineer

  
 E. Mark Malouf, PE  
 Connecticut #17715  
 972-783-2578 ext. 106  
 mmalouf@maloufengineering.com



7/31/2020

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## 1. INTRODUCTION & SCOPE

A rigorous structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Dan Reid, Transcend Wireless, on behalf of T-Mobile, to determine the acceptance of the proposed changed conditions in conformance with the IBC/ANSI/TIA-222-G Standard, "Structural Standard for Antenna Supporting Structures and Antennas".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not within the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

## 2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
<b>STRUCTURE</b>			
<b>Tower</b>	MEI Records	Previous Structural Analysis	ID CT04761S-20V0 Dated 03/20/2020
<b>Foundation</b>	MEI Records	Previous Structural Analysis	ID CT04761S-20V0 Dated 03/20/2020
<b>Material Grade</b>	As per supplied documents (GPD Analysis included specific material grades for the different components) - Refer to Appendix		
<b>CURRENT APPURTENANCES</b>			
	MEI Records	Previous Structural Analysis	ID CT04761S-20V0 Dated 03/20/2020
<b>CHANGED CONDITION</b>			
	Hudson Design Group Mr. Dan Reid	T-Mobile RF Data Sheet	Dated 07/15/2020
		E-Mail Instructions	Dated 07/29/2020

### Background Information:

Based on available information, the following is known regarding this structure:

<b>DESIGNER / FABRICATOR</b>	Not Known / Not Known
<b>ORIGINAL DESIGN CRITERIA</b>	TIA/EIA 222-Unknown
<b>PRIOR STRUCTURAL MODIFICATIONS</b>	As per GPD modification design Job #2012766.02 dated 06/27/2012; and MEI Drawings ID CT04761S-16V0-R1 dated 08/11/2016 are considered properly installed and maintained.



### 3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

<b>CODE / STANDARD</b>	2018 CT Building Code / 2015 Int'l Building Code / ANSI/TIA-222-G-4 Standard	
<b>LOADING CASES</b>	Full Wind:	120 Mph ultimate gust [equiv. 93 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 0.75" Radial Ice
	Service:	60 Mph
	Seismic:	$S_s = 0.230 / S_1 = 0.067 /$ Site Class: D – Stiff Soil
<b>STRUCTURE CRITERIA</b>	Risk Category (Structural Class): Class II	
	Exposure Category: 'C' – Topographic Category: 1	

#### Appurtenances Configuration

The following appurtenances configuration is denoted by the summation of Tables 1 & 2:

**Table 1: Tenant with Changed Condition Appurtenances Configuration**

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location
262	T-Mobile		3	AIR6449 B41 Panel Antennas	[existing mounts]		3	HCS 6x12 Hybrid Fiber Cables-(FZ)
			3	4424 B25 RRH Boxes				
			3	SDX1926Q-43 Diplexers				
<b>Current Appurtenances To Remain</b>								
262	T-Mobile		3	AIR-3246 B66 Panel Antennas	(3) 13ft T-Frame Mounts		6	1-5/8" HCS 6x12 Hybrid Fiber Cables-(FZ)
			3	APXVAARR24_43-U-NA20 Panel Ants.				
			3	KRY 112 144/2 TMA's				
			3	Radio 4449 - B71 + B12 RRU Boxes				
<b>Appurtenances to be Removed</b>								
262	T-Mobile		3	AIR32 B66a/B2a Panel Antennas			6	1-5/8"-(FZ) [if present]

**Table 2: Remaining Tenants Current and Reserved/Future Appurtenances**

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location
365		40	1	12ft Whip Antenna + TMA	10ft Pipe Mount	25	1	7/8"-(FZ)
369.5		38	1	Whip Antenna	15ft Pipe Mount w/ Guys	34	1	1/2"-(FZ)
357	[Dead]	39	1	15ft Whip Antenna	4ft Pipe Mount	-	-	-
362			42	4ft Lightning Rod	14ft Mount		1	Grounding
			41	Beacon / Strobe				
355.5		31	1	4ft Whip Antenna	8ft Pipe Mount	38	1	1-5/8"-(FZ)
354.5		32	1	15ft Whip Antenna	8ft Pipe Mount	39	1	1-5/8"-(FZ)
354.5		30	1	10ft 4-Element Dipole Antenna	8ft Pipe Mount	24	1	7/8"-(FZ)
352			1	Top Stub Tower				
350.5					3ft Empty Sidearm Mount			
					Top Platform w/ Rails			
350	[Dead]					35-36	2	0.25" Cables
350	[Dead]					44	1	0.8" SO Cord
349.75		34	1	8ft Whip Antenna	Railing Mounted	32	1	7/8"-(FZ)
349.5		36	1	21ft Whip Antenna	Railing Mounted	37	1	7/8"-(FZ)
349		37			8ft Empty Pipe Mount			
348.25		29	1	20ft 4-Element Dipole Antenna	6ft Pipe Mount	21	1	7/8"-(FZ)

(Appurtenances continue on next page.)



Table 2: Remaining Tenants Current and Reserved/Future Appurtenances – Cont'd

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location	
347	AT&T [New]		6	800-10964 Panel Antennas	(3) 12ft V-Frame Mounts (Sabre C10857011C) and Modifications	49-60 46-47 48	12 6 3 2	1-5/8" 3/4" DC Power 5/8" Fiber DC Power Cables - (FZ)	
			3	4478 B14 (700) RRH Boxes					
			3	8843 B2/B66A RRH Boxes					
			3	4449 B5/B12 RRH Boxes					
			1	DC6-48-60-08-8C-EV Box					
			3	7770.00 Panel Antennas w/ (2) 7020 RET Motors					
			3	OPA-65R-LCUU-H4 Panel Antennas					
			3	RRUS-32 Boxes					
			6	LGP21401 TMAs					
			6	TPX-070821 Triplexer Boxes					
3	DC6-48-60-18-8C Suppressors								
343.67		27	1	3ft 3-Elem Yagi Antenna	8ft Pipe Mount on Sector Mount	30	1	1/2"-(FZ)	
343.25		33	3	TA-2335-DAB Panel Antennas	8ft Pipe Mount	19	1	EW4.75"x2.5"-(FZ)	
339.5					4-Way Walkway Platform w/ Rails				
338	[Dead]					45	1	3/4" R.C. - (FZ)	
325					(4) Face Frames				
306		21			(4) 14ft Empty Pipe Mounts				
299	[Dead]					23	1	1-1/4"-(FZ)	
269.25		20	2	OB Lights		40	1	0.6" SO Cord	
255.5		17	1	12in Square Panel Antenna	Pipe Mount	1	1	7/8"-(FZ)	
253		16			(2) 25ft Rest Platform w/ Rails				
244	Sprint [New]	-	14	3	APXVSP18-C-A20 Panel Antennas	(3) Sector Mounts	26-28	3	HB114-1 1 1/4" Hybrid Cables LDF4-50A (1/2" FOAM) 1.55" Hybrid Cable - (FZ)
			-	3	Nokia AAHC Boxes				
			-	3	ALU 1900MHz RRH Boxes				
			-	6	ALU 800 MHz 2x50W RRH Boxes				
208.5		12	1	7ft 5-Elem Yagi Antenna	5ft Pipe Mount	31	1	1/2"-(FZ)	
191.5		11			(4) Corner Rest Platforms				
186		10	2	Beacon Ice Shield	Leg Mounted				
182.5		9	2	Beacon / Strobe		41-42	2	0.6" SO Cords	
140	VzW [New]	-	3	JAHH-65B-R3B Panel Antennas	(3) D&D Welding 12ft Arch Boom Mounts + (2) BSAMNT-SBS-2-2 Side-By-Side Mounting Kit + (1) BSAMNT-SBS-2-3 Side-By-Side Mounting Kit	-	3	1-5/8" Hybrid Cables - (FZ)	
			6	JAHH-45B-R3B Panel Antennas					
			3	B13 RRH4x30 Boxes					
			3	B66A RRH4x45W Boxes					
			3	B25 RRH4x30W Boxes					
			3	B5 RRH4x40W - LOC Boxes					
3	RVZDC-6627-PF-48 OVP Boxes								
125	[Dead]					22	1	0.95"-(FZ)	
		8			(2) 41ft Rest Platform w/ Rails				
100		7			4ft Rest Platform w/ Rails				
93		6	2	OB Lights		40		[Shared]	
50.25		5			4ft Rest Platform w/ Rails				
47.5		4	1	3ft Dia. Dish (Az. 220°±)	4ft Sidearm Mount-NW Leg	20	1	7/8"-(FZ)	
31		1	1	4ft Dia. Dish (Az. 200°±)	10ft Pipe Mount/Standoff-S Face	33	1	1/2"-(FZ)	
26		2	1	GPS Antenna	Pipe Mount	29	1	1/2"-(FZ)	
25		3			(4) Corner Rest Platforms				
16.67					(4) Face Frames				



**Notes:**

1. \*\*As per 2018 CTBC /2015 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
2. All elevations are measured from tower base.
3. Please note appurtenances not listed above are to be removed/not present as per data supplied.
4. (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222-G.
5. The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.

## 4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

### Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, *tnxTower* (ver. 8.07), a commercially available program by Tower Numerics Inc. and the second is *STAADPro Connect* FEA program, a structural finite element program by Bentley Systems, Carlsbad, CA. The structure members are modeled using beam/truss members. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the programs for the different loading directions and then applied as external loads on the structure. This analysis comprised of the two different analytical models with combination of the above noted 2 software programs in order to evaluate the different portions of the tower accounting for the geometrical limitation in the *tnxTower* software. Any applicable exemptions, as per Section 15.6 of the TIA-222-G Standard for existing structures originally designed in accordance with a previous revision of the TIA-222 Standard, have been taken.

### Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalidated, MEI should be contacted to review any contradictory information to determine its effect.

### 5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

[Note: The Wind loading controls over the Seismic loading.]

**Table 3: Stress Analysis Results**

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
LEGS	95.36%	25 - 0	Pass	
DIAGONALS	89.14%	125 - 100	Pass	
HORIZONTALS	93.89%	150 - 125	Pass	Bolts Control
SUB-BRACING	<b>98.02%</b>	<b>50 - 25</b>	Pass	
FOUNDATION	66.7%	Uplift	Pass	Geotechnical report not available. Based on soil parameters in calcs supplied. Soil Stability Check Only.

**Table 4: Serviceability Requirements**

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.015 Deg.	1.7125 Deg.	Pass	4ft Dish Elev. 31.00ft
	0.023 Deg.	2.35 Deg.	Pass	3ft Dish Elev. 47.50ft
	0.083 Deg.	4 Deg. from Vert. or Horiz. Axis	Pass	
HORIZONTAL DISPLACEMENT	4.48 In./ 0.11% of Ht.	3.0% of Height	Pass	

**Notes:**

1. Please note that the analysis results noted above are based on the combined analytical models using the 2 noted FEA programs.
2. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
3. Refer to the Appendix 1 for more details on the member loads.
4. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.



## 6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 98.02%** of its support capacity (controlling component: Sub-Bracing) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 1 for more details of the analysis results.
- Based on the stress analysis performed, the existing structure **is in conformance** with the IBC / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.
- Please note that limited foundation data is available and with no geotechnical report. However, based on soil parameters included in supplied data, the foundation is considered acceptable.
- Please note that this analysis study considers all of the recent changes by the different tenants, mainly AT&T, T-Mobile, Verizon and Sprint, as per the latest information available,
- **The installation of the proposed changed condition as noted in Table 1 is structurally acceptable.** Please refer to Appendix 1 for Schematic Lines Layout.
- This structure is near its maximum support capacity for the appurtenances and loading criteria considered. Therefore, no changes to the configuration considered should be made without performing a new proper evaluation.

*Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.*

## 7. REPORT DISCLAIMER

The engineering services rendered by Malouf Engineering International, Inc. ('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.

The analysis performed, and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

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## APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS

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**SYMBOL LIST**

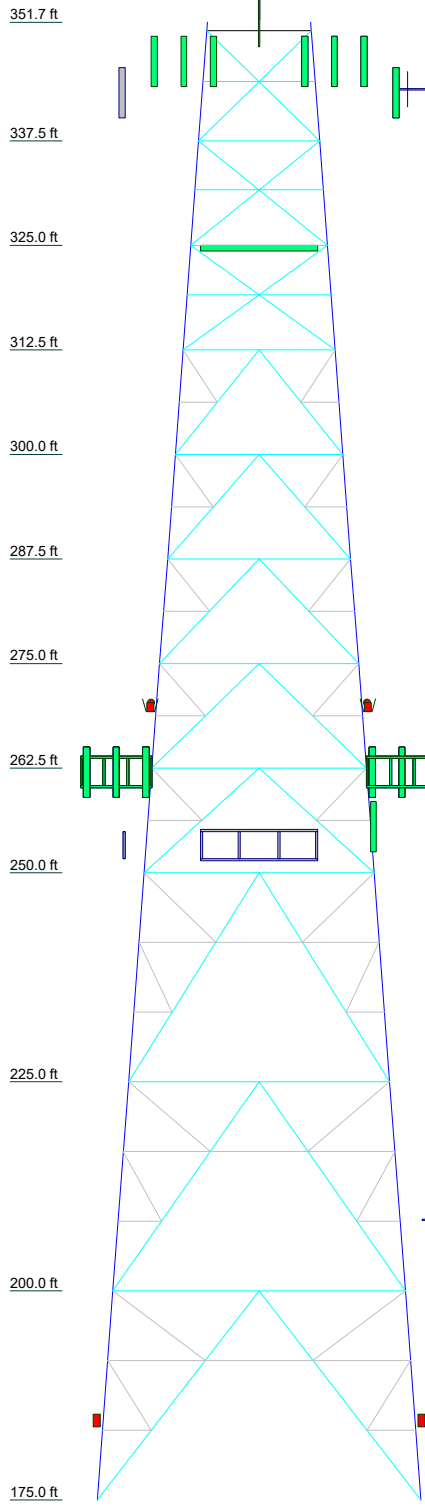
MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x1/4x3/8	B	L2 1/2x2 1/2x3/16

**MATERIAL STRENGTH**


GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. OWNER - FULLER DEVELOPMENT LLC - NORWALK SITE
9. 2018 CT SBC / 2015 IBC / ASCE 7-10 / 120 MPH ULT - RISK CAT. 2



Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L8x8x1 1/8	L8x8x7/8	L6x6x7/8	L6x6x7/8	L6x6x7/8	L6x6x7/8	L6x6x7/8	L6x6x7/8	L6x6x5/8	L6x6x5/8	L6x6x5/8
Leg Grade	A500-46	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Diagonals	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3.5x3/8
Diagonal Grade	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Top Girts	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Horizontals	2L3 1/2x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Sec. Horizontals	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Red. Horizontals	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16	2L1 3/4x1 3/4x3/16
Red. Diagonals	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16
Red. Sub-Horiz	2L2 1/2x3x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Red. Hips	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Inner Bracing	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8	2L3x2 1/2x1/4x3/8
Face Width (ft)	34.938	27.485	23.7594	20.0319	16.1687	12.3054	8.4422	4.4422	1.4422	0.4422	0.4422
# Panels @ (ft)	3 @ 25	3 @ 25	3 @ 25	7 @ 12.5	7 @ 12.5	7 @ 12.5	7 @ 12.5	7 @ 12.5	7 @ 12.5	7 @ 12.5	7 @ 12.5
Weight (K)	100.9	19.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7



**Malouf Engineering Int'l Inc.**  
17950 Preston Road, STE 720  
Dallas, Texas 75252  
Phone: (972) 783 2578  
FAX: (972) 783 2583

**Job: 350ft SST / Norwalk Willard Rd Site #CT11011**

Project: **CT04761S-20V1 - Top Tower**

Client: Transcend Wireless / T-Mobile | Drawn by: KM | App'd:

Code: TIA-222-G | Date: 07/29/20 | Scale: NTS

Path: | Dwg No. E-1



Malouf Engineering International Inc.  
17950 Preston Rd. Suite 720  
Dallas, Texas 75252 / p (972) 783-2575  
maloufengineering.com

Job No  
**CT04761S-20V**

Sheet No  
**1**

Rev  
**0**

Software licensed to MEI IT  
CONNECTED User: Krishna Manda

Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std

Date/Time 29-Jul-2020 17:32

175ft

150ft

125ft

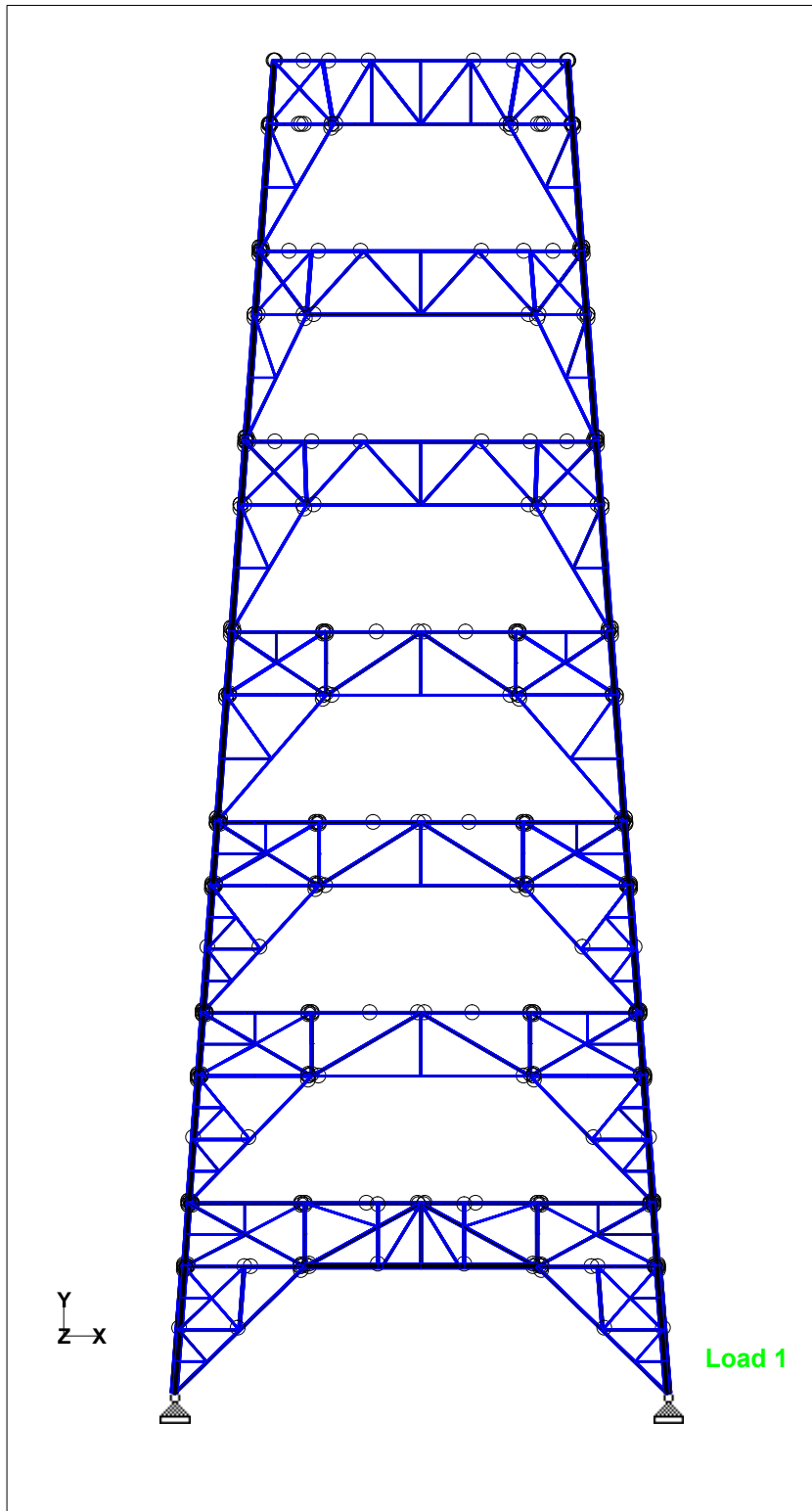
100ft

75ft

50ft

25ft

0ft



Tower Elevation / 0- 175ft

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No.	QTY.	DESCRIPTION	ELEV.	tTENANT
1	1	Conduit Shield	35'	E
2	1	Unused Coduit Supports	320'	E / WG "G"
3	1	Unused Waveguide Brackets	200'	E / WG "H"
4	1	7/8"	255'	E / #1
5	6	1 5/8" (RE-WORK/BUNDLE COAXES IN TWO ROWS)	262'	T-Mobile / E / #2-7
6	6	1 5/8" (TO BE REMOVED)	262'	T-Mobile / R
7	3	HCS 6x12 Hybrid Cable	262'	T-Mobile / E
8	3	HCS 6x12 Hybrid Cable	262'	T-Mobile / P
9	1	Feedline Ladder (Af)	265'	T-Mobile / E / WG "A"
10	1	EW 4.75" x 2.5"	343'	E / #19
11	1	7/8"	47'	E / #20
12	1	7/8"	348'	E / #21
13	1	0.95" Dead Cable	125'	E / #22
14	1	1 1/4" Dead Cable	299'	E / #23
15	2	7/8"	350'	E / #24, 25
16	1	Feedline Ladder (Af)	345'	E / WG "B"
17	3	HB114-1 1 1/4" Hybrid Cable	244'	Sprint / E / #26-28
18	1	LDF4-50A (1/2 FOAM)	26'	E / #29
19	1	Feedline Ladder (Af)	241'	Sprint / E / WG "C"
20	1	1/2"	343'	E / #30
21	1	1/2"	208'	E / #31
22	1	7/8"	349'	E / #32

23	2	1/2"	31'	E / #33, 34
24	1	1/2"	350'	E / #34
25	2	0.25" Dead Cables	350'	E / #35, 36
26	1	7/8"	349'	E / #37
27	2	1 5/8"	350'	E / #38, 39
28	1	Waveguide Brackets	348'	E / WG "D"
29	1	Climbing Ladder	350'	E
30	4	0.6" SO Cords	182'	E / #40-43
31	2	0.6" SO Cords	269'	E / #40,43
32	1	0.6" SO Cord	350'	E / #43
33	1	0.8" Dead SO Cord	350'	E / #44
34	1	3/4" Rigid Conduit Unused	338'	E / #45
35	1	Conduit Shield	35'	E
36	1	Unused Coduit Supports	320'	E / WG "E"
37	1	Grounding Cable	350'	E
38	6	3/4" DC Power Cable	347'	ATT / E
39	12	1 5/8"	347'	ATT / E / #49-60
40	3	5/8" Fiber Cable	347'	ATT / E
41	2	3/4" DC POWER CABLE	345'	ATT / NEW
42	-	-	-	-
43	1	Feedline Ladder (Af)	347'	ATT / E / WG "F"
44	3	1 5/8" Hybrid Cable	140'	VzW / NEW
45	1	LDF4-50A (1/2 FOAM)	244'	SPRINT / E / F
46	1	1.55" Hybrid Cable	244'	SPRINT / NEW

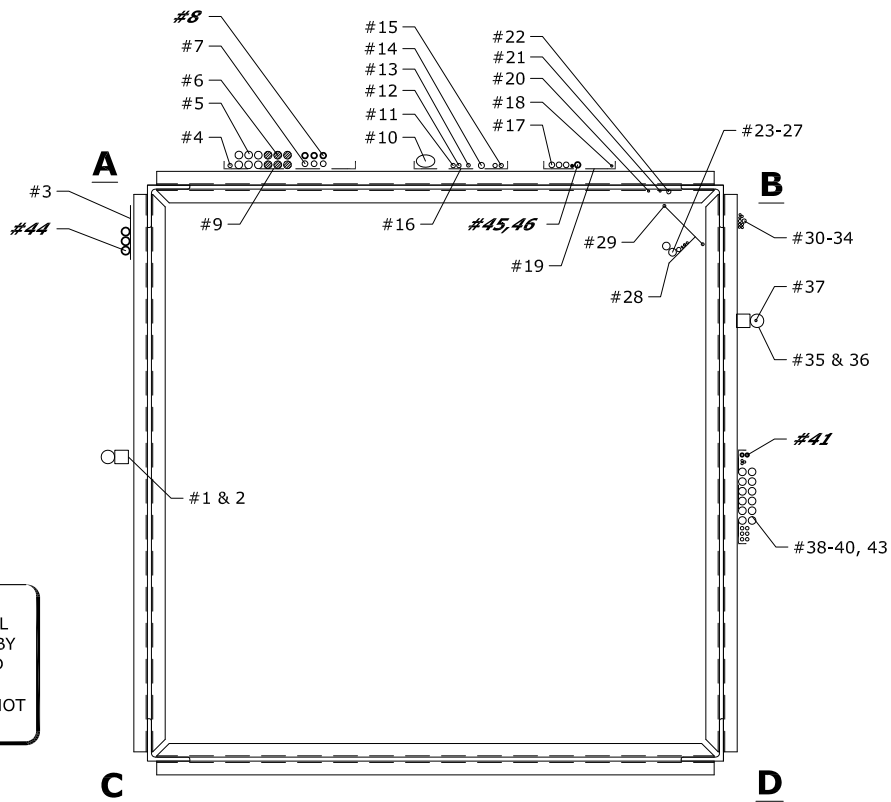
CONTACT MEI IF LINE LAYOUT IS DIFFERENT FROM WHAT IS SHOWN BELOW.

**LEGEND:**

- E = EXISTING #X
- P = PROPOSED #X
- F = FUTURE #X
- R = REMOVE #X
- TO RELOCATE #X

**NOTES:**

- 1) TX-LINE LAYOUT INCLUDED ALL PREVIOUS CHANGES PROPOSED BY VERIZON WIRELESS, SPRINT AND AT&T (TO BE INSTALLED).
- 2) REMOVE ALL OTHER COAXES NOT LISTED ABOVE.



**101 PLAN: SCHEMATIC Tx-LINE LAYOUT**  
SCALE: NOT TO SCALE

**NOTES:**

1. Tx LINE LAYOUT IS SCHEMATIC ONLY, BASED UPON MEI MAPPING (SUB: HTS) DATED 11/30/15.
2. NEW BRACKET SUPPORT SPECIFICATION BY OTHERS.



APPROX.

07/30/2020

MALOUF ENGINEERING INTERNATIONAL, INC.  
  
 STRUCTURAL CONSULTANTS

17950 PRESTON ROAD SUITE 720  
 DALLAS, TEXAS 75252-5635  
 972-783-2578 (fax: 2583)  
 www.maloufengineering.com

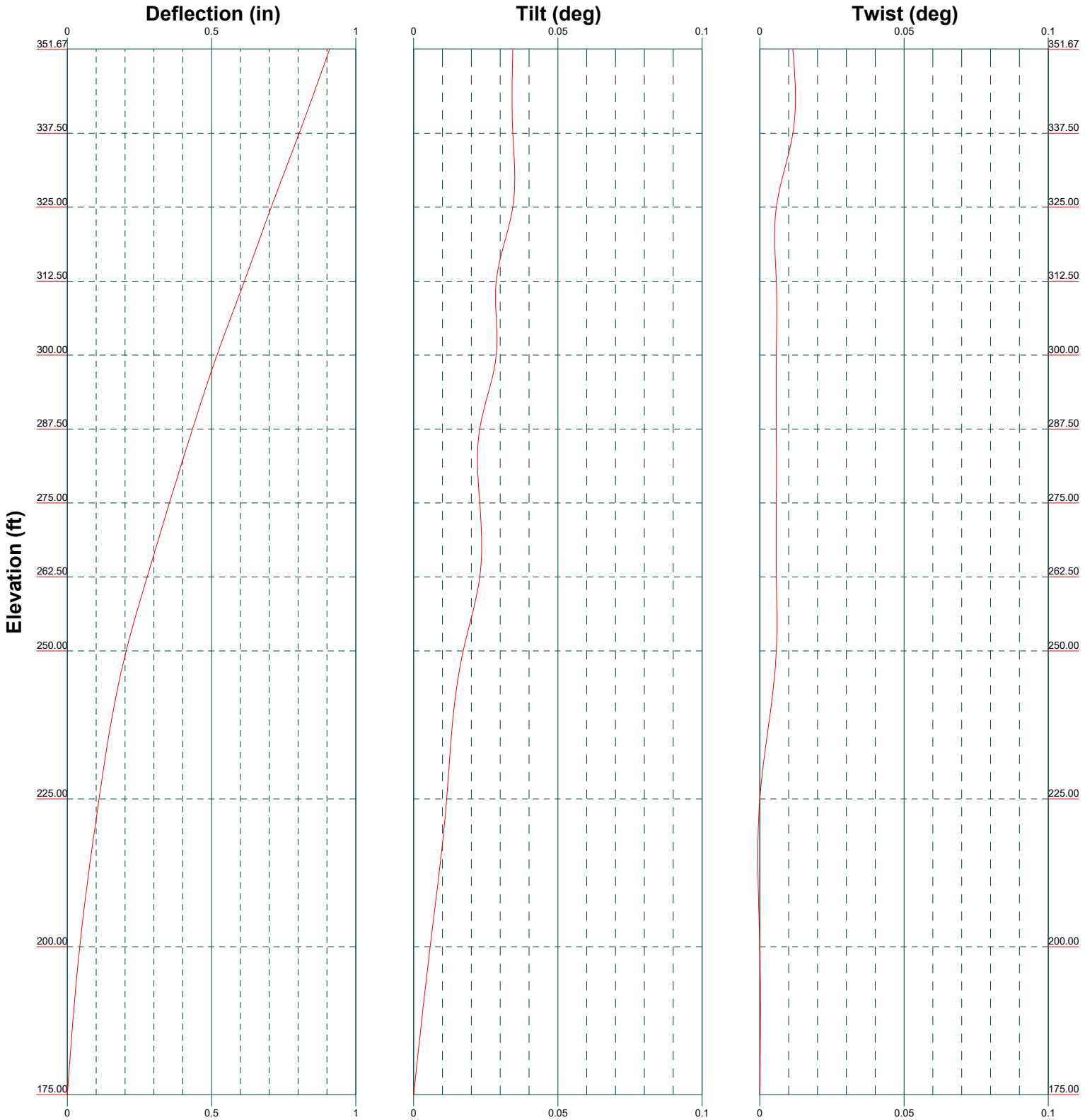
© MEI, INC. 2020



**350FT SST/NORWALK WILLARD RD SITE #CT11011D**

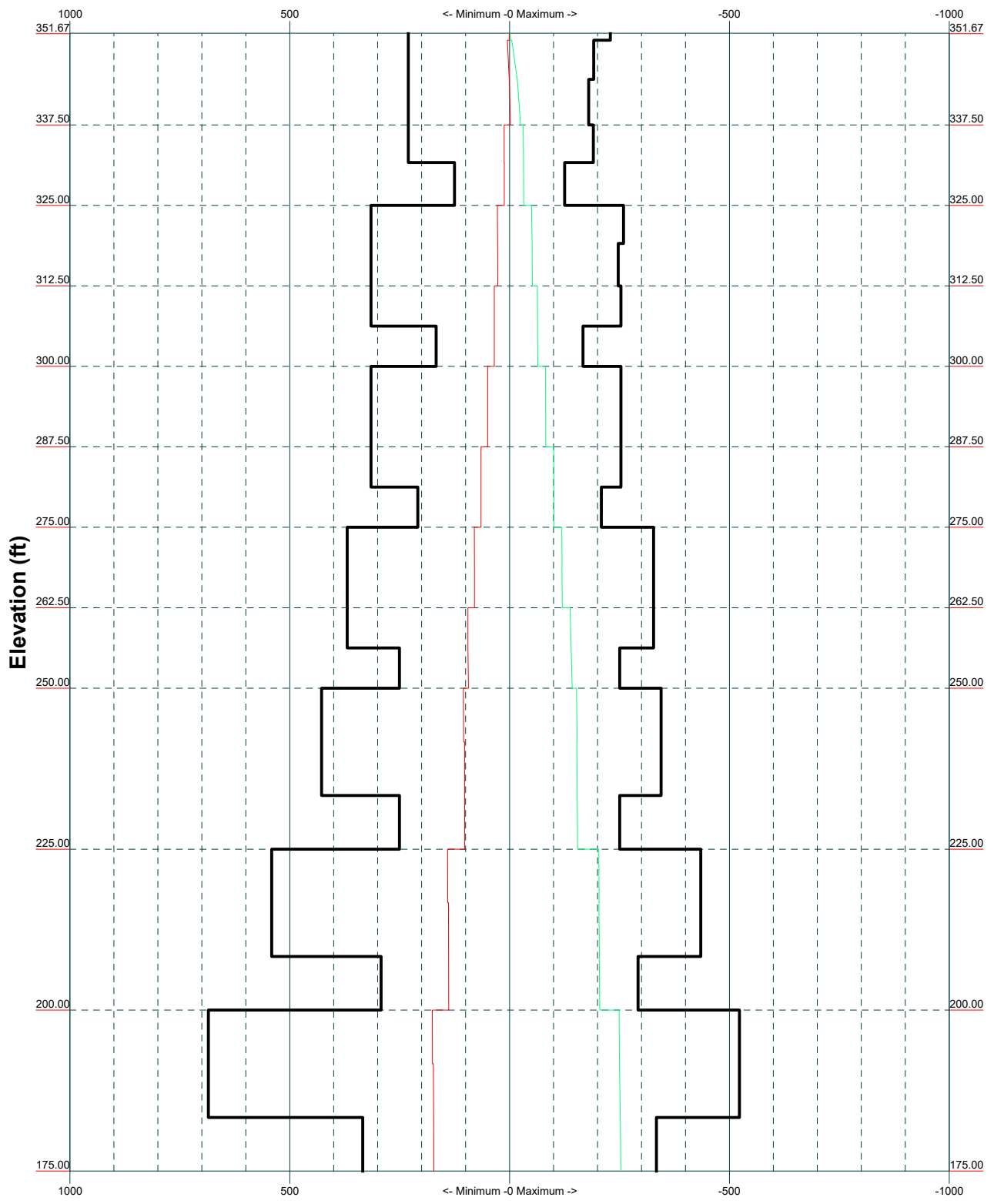
**TOWER TxLINE LAYOUT**


MEI PROJECT ID	SHEET NUMBER	REV.
CT04761S-20V1	<b>L01</b>	<b>0</b>



TIA-222-G - 93 mph/50 mph 0.7500 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



 <p>maloufengineering.com</p>	<p><b>Malouf Engineering Int'l Inc.</b>                  17950 Preston Road, STE 720                  Dallas, Texas 75252                  Phone: (972) 783 2578                  FAX: (972) 783 2583</p>		<p>Job: <b>350ft SST / Norwalk Willard Rd Site #CT11011</b></p>	
	<p>Project: <b>CT04761S-20V1 - Top Tower</b></p>		<p>Client: Transcend Wireless / T-Mobile</p>	<p>Drawn by: KM</p>
	<p>Code: TIA-222-G</p>		<p>Date: 07/29/20</p>	<p>App'd:</p>
	<p>Path:</p>		<p>Scale: NTS</p>	<p>Dwg No. E-3</p>
	<p>maloufengineering.com</p>		<p>© 2007 Malouf Engineering Int'l Inc. All rights reserved. No part of this document may be reproduced without the written permission of Malouf Engineering Int'l Inc.</p>	

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 1 of 17
	<b>Project</b> CT04761S-20V1	<b>Date</b> 16:11:42 07/29/20
	<b>Client</b> Transcend Wireless / T-Mobile	<b>Designed by</b> KM

## Tower Input Data

The main tower is a 4x free standing tower with an overall height of 351.67 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 12.33 ft at the top and 64.75 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 93 mph.

Structure Class II.

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.

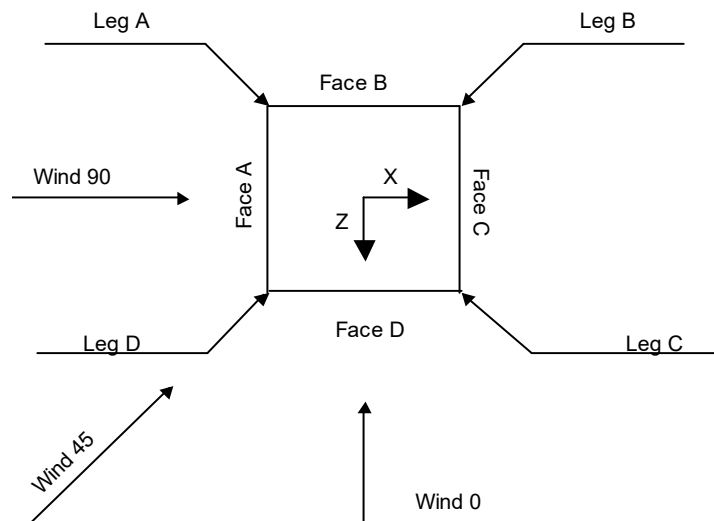
OWNER - FULLER DEVELOPMENT LLC - NORWALK SITE.

2018 CT SBC / 2015 IBC / ASCE 7-10 / 120 MPH ULT - RISK CAT. 2.

Pressures are calculated at each section.

Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



**Square Tower**

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 2 of 17
	<b>Project</b> CT04761S-20V1	<b>Date</b> 16:11:42 07/29/20
	<b>Client</b> Transcend Wireless / T-Mobile	<b>Designed by</b> KM

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Placement	#	Weight
			plf
Conduit Shield (E)	35.00 - 12.00	1	18.50
Unused Coduit Supports (E / WG "G")	320.00 - 37.00	1	9.56
1-5/8" (6x12) Hybrid (HFT1206-24 SV2-xx) or Equiv. (VzW / New)	140.00 - 6.00	3	1.78
Unused Waveguide Brackets (E / WG "H")	200.00 - 27.00	1	1.25
7/8 (E / #1)	255.50 - 6.00	1	0.54
1 5/8 (Rework - Bundle / T-Mobile / E / #2-7)	262.00 - 6.00	6	1.04
HCS 6x12 Hybrid Fiber Cable (T-Mobile / E)	262.00 - 6.00	3	2.40
HCS 6x12 Hybrid Fiber Cable (T-Mobile / E)	262.00 - 6.00	3	2.40
Feedline Ladder (Af) (T-Mobile / E / WG "A")	265.00 - 8.50	1	8.40
EW 4.75" x 2.5" (E / #19)	343.25 - 6.00	1	1.85
7/8 (E / #20)	47.50 - 6.00	1	0.54
7/8 (E / #21)	348.25 - 6.00	1	0.54
0.95" Dead Cable (E / #22)	125.00 - 6.00	1	0.49
1 1/4 Dead Cable (E / #23)	299.00 - 6.00	1	0.66
7/8 (E / #24, 25)	350.00 - 6.00	2	0.54
Feedline Ladder (Af) (E / WG "B")	345.00 - 8.50	1	8.50
HB114-1 1/4" Hybrid Cable (Sprint / E / #26-28)	244.00 - 0.00	3	1.08
LDF4-50A	244.00 - 0.00	1	0.15

Description	Placement	#	Weight
			plf
(1/2 FOAM) (Sprint / E)	0.00		
1.55" Hybrid Cable (Sprint / New)	244.00 - 0.00	1	1.25
LDF4-50A (1/2 FOAM) (E / #29)	26.00 - 0.00	1	0.15
Feedline Ladder (Af) (Sprint / E / WG "C")	241.00 - 2.00	1	8.45
1/2 (E / #30)	343.67 - 6.00	1	0.25
1/2 (E / #31)	208.50 - 6.00	1	0.25
7/8 (E / #32)	349.75 - 6.00	1	0.54
1/2 (E / #33, 34)	31.00 - 6.00	2	0.25
1/2 (E / #34)	350.00 - 6.00	1	0.25
0.25" Dead Cables (E / #35, 36)	350.00 - 6.00	2	0.26
7/8 (E / #37)	349.50 - 6.00	1	0.54
1 5/8 (E / #38, 39)	350.00 - 6.00	2	1.04
Waveguide Brackets (E / WG "D")	348.00 - 15.00	1	1.15
Climbing Ladder (E)	350.00 - 0.50	1	9.50
Safety Rail (E)	350.00 - 0.00	1	2.75
0.6" SO Cords (E / #40-43)	182.50 - 0.00	4	0.35
0.6" SO Cords (E / #40,43)	269.25 - 182.50	2	0.35
0.6" SO Cord (E / #43)	350.00 - 269.25	1	0.35
0.8" Dead SO Cord (E / #44)	350.00 - 14.00	1	0.40
3/4" Rigid Conduit (Unused) (E / #45)	338.00 - 0.00	1	1.13
Conduit Shield (E)	35.00 - 12.00	1	18.50
Unused Coduit Supports (E / WG "E")	320.00 - 37.00	1	9.56
Grounding Cable (E)	350.00 - 0.00	1	0.25

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 3 of 17
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	<b>Client</b> Transcend Wireless / T-Mobile	<b>Designed by</b> KM

Description	Placement	#	Weight
	ft		plf
3/4" DC Power Cable (ATT / E / #46,47)	347.00 - 6.00	6	0.80
3/4" DC Power Cable (ATT / New)	347.00 - 6.00	2	0.80
1 5/8" (ATT / E / #49-60)	347.00 - 6.00	12	1.04
5/8" Fiber	347.00 -	3	0.50

Description	Placement	#	Weight
	ft		plf
Cable (ATT / E / #48)	6.00		
Feedline Ladder (Af) (ATT / E / WG "F")	345.00 - 14.50	1	13.50

### Discrete Tower Loads

Description	Placement	Weight
	ft	K
4ft Lightning Rod (E / #42)	364.00	0.01
Beacon / Strobe (E / #41)	363.00	0.01
14ft Mount (E / #41 / 42)	355.00	0.04
12ft Whip Antenna (E / #40)	371.00	0.07
TMA (E / #40)	353.00	0.09
10ft Pipe Mount (E / #40)	360.00	0.17
15ft Whip Antenna (E / #39)	364.50	0.25
4ft Pipe Mount (E / #39)	356.25	0.33
Top Stub Tower (E)	352.00	0.02
Whip (E / #38)	369.50	0.04
15ft Pipe Mount w/ Guys (E / #38)	355.50	0.06
8ft Empty Pipe Mount (E / #37)	349.00	0.08
21ft Whip Antenna (E / #36)	349.50	0.02
3ft Empty Side Arm Mount (E / #35)	350.50	0.05
8ft Whip Antenna	349.75	0.07

Description	Placement	Weight
	ft	K
(E / #34)		0.03
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.04
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.06
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.11
15ft Whip Antenna (E / #32)	354.50	0.17
8ft Pipe Mount (E / #32)	351.00	0.06
4ft Whip Antenna (E / #31)	355.50	0.11
8ft Pipe Mount (E / #31)	351.00	0.17
10ft 4-Element Dipole (E / #30)	354.50	0.03
8ft Pipe Mount (E / #30)	351.00	0.08
20ft 4-Element Dipole (E / #29)	348.25	0.04
6ft Pipe Mount (E / #29)	351.00	0.09
Top Platform w/ Rails (E)	350.50	0.13
3ft 3-Elem Yagi (Unknown / E / #27)	343.67	0.04
8ft Pipe Mount on Sector Mount	341.00	0.05



<p style="text-align: center;"><b>tnxTower</b></p> <p><b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	<p><b>Job</b></p> <p style="text-align: center;">350ft SST / Norwalk Willard RD Site #CT11011D</p>	<p><b>Page</b></p> <p style="text-align: center;">4 of 17</p>
	<p><b>Project</b></p> <p style="text-align: center;">CT04761S-20V1</p>	<p><b>Date</b></p> <p style="text-align: center;">16:11:42 07/29/20</p>
	<p><b>Client</b></p> <p style="text-align: center;">Transcend Wireless / T-Mobile</p>	<p><b>Designed by</b></p> <p style="text-align: center;">KM</p>

Description	Placement ft	Weight K	Description	Placement ft	Weight K
(Unknown / E / #27)		0.03	(ATT / E)		0.10
Raycap DC6-48-60-18-8C	347.00	0.02			0.14
Supressor		0.04	(2) 800-10964 w/ Pipe Mount	347.00	0.12
(ATT / E)		0.05	(ATT / New)		0.20
Raycap DC6-48-60-18-8C	347.00	0.02			0.28
Supressor		0.04	(2) 800-10964 w/ Pipe Mount	347.00	0.12
(ATT / E)		0.05	(ATT / New)		0.20
Raycap DC6-48-60-18-8C	347.00	0.02			0.28
Supressor		0.04	(2) 800-10964 w/ Pipe Mount	347.00	0.12
(ATT / E)		0.05	(ATT / New)		0.20
7770.00 Panels w/ Pipe	347.00	0.04			0.28
Mount		0.09	RRUS-4478 B14	347.00	0.06
(ATT / E / #24)		0.15	(ATT / New)		0.07
7770.00 Panels w/ Pipe	347.00	0.04			0.09
Mount		0.09	RRUS-4478 B14	347.00	0.06
(ATT / E / #24)		0.15	(ATT / New)		0.07
7770.00 Panels w/ Pipe	347.00	0.04			0.09
Mount		0.09	RRUS-4478 B14	347.00	0.06
(ATT / E / #24)		0.15	(ATT / New)		0.07
(2) LGP21401 TMA'S	347.00	0.02			0.09
(ATT / E / #24)		0.03	RADIO 8843 B2/B66A	347.00	0.07
		0.04	(ATT / New)		0.09
(2) LGP21401 TMA'S	347.00	0.02			0.11
(ATT / E / #24)		0.03	RADIO 8843 B2/B66A	347.00	0.07
		0.04	(ATT / New)		0.09
(2) LGP21401 TMA'S	347.00	0.02			0.11
(ATT / E / #24)		0.03	RADIO 8843 B2/B66A	347.00	0.07
		0.04	(ATT / New)		0.09
(2) 7020 RET Motor	344.50	0.00			0.11
(ATT / E)		0.00	RRUS-4449 B5/B12 RRH's	347.00	0.07
		0.00	(ATT / New)		0.09
(2) 7020 RET Motor	344.50	0.00			0.11
(ATT / E)		0.00	RRUS-4449 B5/B12 RRH's	347.00	0.07
		0.00	(ATT / New)		0.09
(2) 7020 RET Motor	344.50	0.00			0.11
(ATT / E)		0.00	RRUS-4449 B5/B12 RRH's	347.00	0.07
		0.00	(ATT / New)		0.09
(2) TPX-070821 Triplexer	347.00	0.01			0.11
(ATT / E)		0.01	Raycap DC6-48-60-0-8C-EV	347.00	0.03
		0.02	Supressor		0.04
(2) TPX-070821 Triplexer	347.00	0.01	(ATT / New)		0.05
(ATT / E)		0.01	12ft V-Frame Mount (Sabre	347.00	0.55
		0.02	C10857011C)		0.78
(2) TPX-070821 Triplexer	347.00	0.01	(ATT / New)		1.00
(ATT / E)		0.01	12ft V-Frame Mount (Sabre	347.00	0.55
		0.02	C10857011C)		0.78
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(ATT / New)		1.00
Mounts		0.13	12ft V-Frame Mount (Sabre	347.00	0.55
(ATT / E)		0.20	C10857011C)		0.78
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(ATT / New)		1.00
Mounts		0.13	Proposed Reinforcement	350.00 - 339.00	0.35
(ATT / E)		0.20	(ATT / New)		0.50
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08			0.65
Mounts		0.13	Proposed Reinforcement	350.00 - 339.00	0.35
(ATT / E)		0.20	(ATT / New)		0.50
RRUS-32	347.00	0.08			0.65
(ATT / E)		0.10	Proposed Reinforcement	350.00 - 339.00	0.35
		0.14	(ATT / New)		0.50
RRUS-32	347.00	0.08			0.65
(ATT / E)		0.10	4-Way Walkway Platform w/	339.00	10.25
		0.14	Rails		13.32
RRUS-32	347.00	0.08	(E)		16.40

<p style="text-align: center;"><b><i>tnxTower</i></b></p> <p><b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	<b>Job</b>	350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b>	5 of 17
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	<b>Client</b>	Transcend Wireless / T-Mobile	<b>Designed by</b>	KM

Description	Placement ft	Weight K	Description	Placement ft	Weight K
Corner Ladder (E)	350.00 - 339.00	0.45 0.59 0.74	RADIO 4424 B25 RRU's (T-Mobile / P)	262.00	0.13 0.09 0.11
4-Way Face Frame (E)	325.00	3.00 3.90 4.79	RADIO 4424 B25 RRU's (T-Mobile / P)	262.00	0.13 0.09 0.11
(4) 14ft Empty Pipe Mounts (E / #21)	306.00	0.06 0.09 0.13	SDX1926Q-43 Diplexer (T-Mobile / P)	262.00	0.13 0.05 0.05
OB Light (E / #20)	269.25	0.01 0.01 0.02	SDX1926Q-43 Diplexer (T-Mobile / P)	262.00	0.06 0.05 0.05
OB Light (E / #20)	269.25	0.01 0.01 0.02	SDX1926Q-43 Diplexer (T-Mobile / P)	262.00	0.06 0.05 0.05
AIR-3246 B66 Panel w/ Pipe Mount (T-Mobile / E)	262.00	0.22 0.29 0.37	Jumper Cables (T-Mobile / E / P)	262.00	0.06 0.09 0.12
AIR-3246 B66 Panel w/ Pipe Mount (T-Mobile / E)	262.00	0.22 0.29 0.37	13ft T-Frame Mount (T-Mobile / E)	262.00	0.35 0.48 0.60
AIR-3246 B66 Panel w/ Pipe Mount (T-Mobile / E)	262.00	0.22 0.29 0.37	13ft T-Frame Mount (T-Mobile / E)	262.00	0.35 0.48 0.60
APXVAARR24_43-U-NA20 w/ Pipe Mount (T-Mobile / E)	262.00	0.18 0.32 0.46	13ft T-Frame Mount (T-Mobile / E)	262.00	0.35 0.48 0.60
APXVAARR24_43-U-NA20 w/ Pipe Mount (T-Mobile / E)	262.00	0.18 0.32 0.46	12" Square Panel w/ Pipe Mount (E / #17)	255.50	0.01 0.02 0.03
APXVAARR24_43-U-NA20 w/ Pipe Mount (T-Mobile / E)	262.00	0.18 0.32 0.46	25ft Rest Platform w/ Rails (E / #16)	251.50	2.65 3.58 4.50
AIR 6449 B41 Panel w/ Pipe Mount (T-Mobile / P)	262.00	0.13 0.19 0.25	25ft Rest Platform w/ Rails (E / #16)	251.50	2.65 3.58 4.50
AIR 6449 B41 Panel w/ Pipe Mount (T-Mobile / P)	262.00	0.13 0.19 0.25	APXVSPP18-C-A20 w / Pipe Mount (Sprint / E / #14)	244.00	0.09 0.16 0.24
AIR 6449 B41 Panel w/ Pipe Mount (T-Mobile / P)	262.00	0.13 0.19 0.25	APXVSPP18-C-A20 w / Pipe Mount (Sprint / E / #14)	244.00	0.09 0.16 0.24
KRY 112 144/2 TMA (T-Mobile / E)	262.00	0.01 0.02 0.02	APXVSPP18-C-A20 w / Pipe Mount (Sprint / E / #14)	244.00	0.09 0.16 0.24
KRY 112 144/2 TMA (T-Mobile / E)	262.00	0.01 0.02 0.02	1900MHz RRH (Sprint / E)	244.00	0.06 0.08 0.11
KRY 112 144/2 TMA (T-Mobile / E)	262.00	0.01 0.02 0.02	1900MHz RRH (Sprint / E)	244.00	0.06 0.08 0.11
RADIO 4449 - B71 + B12 (T-Mobile / E)	262.00	0.07 0.09 0.11	1900MHz RRH (Sprint / E)	244.00	0.06 0.08 0.11
RADIO 4449 - B71 + B12 (T-Mobile / E)	262.00	0.07 0.09 0.11	AAHC (Sprint / New)	244.00	0.11 0.14 0.18
RADIO 4449 - B71 + B12 (T-Mobile / E)	262.00	0.07 0.09 0.11	AAHC (Sprint / New)	244.00	0.11 0.14 0.18
RADIO 4424 B25 RRU's (T-Mobile / P)	262.00	0.09 0.11	AAHC	244.00	0.18 0.11

<p><b>tnxTower</b></p> <p><b>Malouf Engineering Int'l Inc.</b>  17950 Preston Road, STE 720  Dallas, Texas 75252  Phone: (972) 783 2578  FAX: (972) 783 2583</p>	<b>Job</b>	350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b>	6 of 17
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Description	Placement ft	Weight K	Description	Placement ft	Weight K
(Sprint / New)		0.14	OB Light	93.00	0.01
		0.18	(E / #6)		0.01
(2) 800 MHz 2x50W RRH	244.00	0.06			0.02
(Sprint / New)		0.09	4ft Rest Platform w/ Rails	50.25	0.45
		0.11	(E / #5)		0.61
(2) 800 MHz 2x50W RRH	244.00	0.06			0.77
(Sprint / New)		0.09	4ft Side Arm	46.50	0.55
		0.11	(E / #4)		0.78
(2) 800 MHz 2x50W RRH	244.00	0.06			1.00
(Sprint / New)		0.09	Corner Rest Platform	26.00	0.75
		0.11	(E / #3)		1.01
13ft Sector Mount	244.25 - 241.50	0.57			1.27
(Sprint / E / #13-15)		0.78	Corner Rest Platform	26.00	0.75
		0.98	(E / #3)		1.01
13ft Sector Mount	244.25 - 241.50	0.57			1.27
(Sprint / E / #13-15)		0.78	Corner Rest Platform	26.00	0.75
		0.98	(E / #3)		1.01
13ft Sector Mount	244.25 - 241.50	0.57			1.27
(Sprint / E / #13-15)		0.78	Corner Rest Platform	26.00	0.75
		0.98	(E / #3)		1.01
7ft 5-Elem Yagi	208.50	0.01			1.27
(E / #12)		0.02	GPS w/ Pipe Mount	26.00	0.01
		0.03	(E / #2)		0.01
5ft Pipe Mount	204.50	0.03			0.01
(E / #12)		0.03	10ft Pipe Mount w/ Standoff	34.00 - 24.00	0.12
		0.04	(E / #1)		0.16
Corner Rest Platform	191.50	0.75			0.19
(E / #11)		1.01	Face Frame w/ Knee Braces	25.00 - 16.67	8.50
		1.27	(E)		11.05
Corner Rest Platform	191.50	0.75			13.60
(E / #11)		1.01	(3) JAHH-65B-R3B w/ Pipe	140.00	0.11
		1.27	Mount		0.19
Corner Rest Platform	191.50	0.75	(VzW / New / F)		0.27
(E / #11)		1.01	(3) JAHH-45B-R3B w/ pipe	140.00	0.14
		1.27	mount		0.22
Corner Rest Platform	191.50	0.75	(VzW / New / F)		0.32
(E / #11)		1.01	(3) JAHH-45B-R3B w/ pipe	140.00	0.14
		1.27	mount		0.22
Beacon Ice Shield	186.00	0.10	(VzW / New / F)		0.32
(E / #10)		0.14	BSAMNT-SBS-2-3	140.00	0.11
		0.17	Side-By-Side Mounting Kit		0.12
Beacon Ice Shield	186.00	0.10	(VzW / New)		0.12
(E / #10)		0.14	BSAMNT-SBS-2-2	140.00	0.07
		0.17	Side-By-Side Mounting Kit		0.07
Beacon / Strobe	182.50	0.14	(VzW / New)		0.07
(E / #9)		0.18	BSAMNT-SBS-2-2	140.00	0.07
		0.22	Side-By-Side Mounting Kit		0.07
Beacon / Strobe	182.50	0.14	(VzW / New)		0.07
(E / #9)		0.18	B13 RRH4x30	140.00	0.06
		0.22	(VzW / New)		0.08
41ft Rest Platform w/ Rails	125.00	3.75			0.10
(E / #8)		5.50	B13 RRH4x30	140.00	0.06
		7.25	(VzW / New)		0.08
41ft Rest Platform w/ Rails	125.00	3.75			0.10
(E / #8)		5.50	B13 RRH4x30	140.00	0.06
		7.25	(VzW / New)		0.08
4ft Rest Platform w/ Rails	100.00	0.45			0.10
(E / #7)		0.61	B66A RRH4x45W	140.00	0.06
		0.77	(VzW / New)		0.08
OB Light	93.00	0.01			0.11
(E / #6)		0.01	B66A RRH4x45W	140.00	0.06
		0.02	(VzW / New)		0.08

<p style="text-align: center;"><b>tnxTower</b></p> <p><b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 7 of 17
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Description	Placement ft	Weight K
B66A RRH4x45W (VzW / New)	140.00	0.11 0.06 0.08
B25 RRH4x30W (VzW / New)	140.00	0.06 0.08 0.10
B25 RRH4x30W (VzW / New)	140.00	0.06 0.08 0.10
B25 RRH4x30W (VzW / New)	140.00	0.06 0.08 0.10
B5 RRH4x40W - LOC (VzW / New / F)	140.00	0.05 0.06 0.08
B5 RRH4x40W - LOC (VzW / New / F)	140.00	0.05 0.06 0.08
B5 RRH4x40W - LOC	140.00	0.05

Description	Placement ft	Weight K
(VzW / New / F)		0.06 0.08
RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03 0.07 0.11
RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03 0.07 0.11
RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03 0.07 0.11
D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38 0.50 0.63
D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38 0.50 0.63
D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38 0.50 0.63

## Dishes

Description	Elevation ft	Weight K
3ft Dish (E / #4)	47.50	0.09 0.13 0.17
4ft Dish (E / #1)	31.00	0.10 0.17 0.24

## 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 45 deg - No Ice
5	0.9 Dead+1.6 Wind 45 deg - No Ice
6	1.2 Dead+1.6 Wind 90 deg - No Ice
7	0.9 Dead+1.6 Wind 90 deg - No Ice
8	1.2 Dead+1.6 Wind 135 deg - No Ice
9	0.9 Dead+1.6 Wind 135 deg - No Ice
10	1.2 Dead+1.6 Wind 180 deg - No Ice
11	0.9 Dead+1.6 Wind 180 deg - No Ice
12	1.2 Dead+1.6 Wind 225 deg - No Ice
13	0.9 Dead+1.6 Wind 225 deg - No Ice
14	1.2 Dead+1.6 Wind 270 deg - No Ice
15	0.9 Dead+1.6 Wind 270 deg - No Ice
16	1.2 Dead+1.6 Wind 315 deg - No Ice
17	0.9 Dead+1.6 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp

Comb. No.	Description
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 deg - Service

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 8 of 17
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### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	351.67 - 337.5	0.909	28	0.0332	0.0094
T2	337.5 - 325	0.804	28	0.0329	0.0090
T3	325 - 312.5	0.707	28	0.0316	0.0086
T4	312.5 - 300	0.614	28	0.0300	0.0081
T5	300 - 287.5	0.519	28	0.0283	0.0072
T6	287.5 - 275	0.434	28	0.0258	0.0065
T7	275 - 262.5	0.354	28	0.0228	0.0057
T8	262.5 - 250	0.277	28	0.0201	0.0048
T9	250 - 225	0.204	28	0.0170	0.0037
T10	225 - 200	0.110	32	0.0112	0.0025
T11	200 - 175	0.043	32	0.0059	0.0012

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
371.00	12ft Whip Antenna	28	0.909	0.0332	0.0094	660633
369.50	Whip	28	0.909	0.0332	0.0094	660633
364.50	15ft Whip Antenna	28	0.909	0.0332	0.0094	660633
364.00	4ft Lightning Rod	28	0.909	0.0332	0.0094	660633
363.00	Beacon / Strobe	28	0.909	0.0332	0.0094	660633
360.00	10ft Pipe Mount	28	0.909	0.0332	0.0094	660633
356.25	4ft Pipe Mount	28	0.909	0.0332	0.0094	660633
355.50	15ft Pipe Mount w/ Guys	28	0.909	0.0332	0.0094	660633
355.00	14ft Mount	28	0.909	0.0332	0.0094	660633
354.50	15ft Whip Antenna	28	0.909	0.0332	0.0094	660633
353.00	TMA	28	0.909	0.0332	0.0094	660633
352.00	Top Stub Tower	28	0.909	0.0332	0.0094	660633
351.00	8ft Pipe Mount	28	0.904	0.0332	0.0094	660633
350.50	3ft Empty Side Arm Mount	28	0.900	0.0332	0.0094	660633
350.00	New Reinforcement	28	0.896	0.0332	0.0094	660633
349.75	8ft Whip Antenna	28	0.895	0.0332	0.0094	660633
349.50	21ft Whip Antenna	28	0.893	0.0332	0.0094	660633
349.00	8ft Empty Pipe Mount	28	0.889	0.0332	0.0094	660633
348.25	20ft 4-Element Dipole	28	0.884	0.0332	0.0094	660633
347.00	Raycap DC6-48-60-18-8C Suppressor	28	0.875	0.0332	0.0093	660633
344.50	(2) 7020 RET Motor	28	0.856	0.0332	0.0093	460692
343.67	3ft 3-Elem Yagi	28	0.850	0.0331	0.0092	412894
343.25	TA-2335-DAB Panel w/ Pipe Mount	28	0.847	0.0331	0.0092	392299
341.00	8ft Pipe Mount on Sector Mount	28	0.830	0.0331	0.0092	311642
339.00	New Reinforcement	28	0.815	0.0330	0.0091	280634
325.00	4-Way Face Frame	28	0.707	0.0316	0.0086	332891
306.00	(4) 14ft Empty Pipe Mounts	28	0.564	0.0292	0.0077	508627
269.25	OB Light	28	0.319	0.0215	0.0053	Inf
262.00	AIR-3246 B66 Panel w/ Pipe Mount	28	0.274	0.0200	0.0048	Inf
255.50	12" Square Panel w/ Pipe Mount	28	0.235	0.0184	0.0042	132218
251.50	25ft Rest Platform w/ Rails	28	0.212	0.0174	0.0039	85310
244.25	13ft Sector Mount	28	0.177	0.0156	0.0034	92743
244.00	APXVSPPI8-C-A20 w / Pipe Mount	28	0.176	0.0156	0.0034	94019
242.88	13ft Sector Mount	28	0.171	0.0153	0.0033	100225
241.50	13ft Sector Mount	28	0.166	0.0150	0.0032	109020
208.50	7ft 5-Elem Yagi	32	0.064	0.0078	0.0016	254732
204.50	5ft Pipe Mount	32	0.053	0.0069	0.0014	203863

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 9 of 17
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Elevation	Appurtenance	Gov. Load	Deflection	Tilt	Twist	Radius of Curvature
ft		Comb.	in	°	°	ft
191.50	Corner Rest Platform	32	0.026	0.0040	0.0008	252184
186.00	Beacon Ice Shield	32	0.017	0.0027	0.0005	378276
182.50	Beacon / Strobe	32	0.011	0.0018	0.0003	554798

### Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load	Tilt	Twist
	ft	in	Comb.	°	°
T1	351.67 - 337.5	3.369	4	0.1201	0.0363
T2	337.5 - 325	2.987	4	0.1192	0.0347
T3	325 - 312.5	2.635	4	0.1146	0.0330
T4	312.5 - 300	2.292	4	0.1088	0.0311
T5	300 - 287.5	1.945	4	0.1025	0.0278
T6	287.5 - 275	1.628	4	0.0934	0.0248
T7	275 - 262.5	1.336	4	0.0826	0.0218
T8	262.5 - 250	1.050	4	0.0728	0.0183
T9	250 - 225	0.777	4	0.0617	0.0142
T10	225 - 200	0.425	8	0.0408	0.0094
T11	200 - 175	0.161	12	0.0215	0.0045

### Section Capacity Table

Section No.	Elevation	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
T1	351.67 - 337.5	Leg	L6x6x5/8	3	-24.79	179.77	13.8	Pass
		Diagonal	L3 1/2x3 1/2x5/16	14	-8.21	20.67	39.7	Pass
		Secondary Horizontal	L3x3x1/4	18	-2.28	15.87	14.4	Pass
		Top Girt	C8x11.5	6	-0.12	54.59	0.7	Pass
T2	337.5 - 325	Leg	L6x6x5/8	23	-32.09	180.87	17.7	Pass
							25.6 (b)	
		Diagonal	L3 1/2x3 1/2x5/16	34	-10.88	19.20	56.7	Pass
		Horizontal	C7x9.8	25	3.76	87.64	4.3	Pass
						9.0 (b)		
T3	325 - 312.5	Secondary Horizontal	L3x2 1/2x1/4	38	-0.48	8.46	5.7	Pass
		Leg	L6x6x7/8	43	-51.90	247.24	21.0	Pass
		Diagonal	L3 1/2x4x5/16	59	-12.01	20.13	59.6	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	47	6.24	63.37	9.8	Pass
						11.6 (b)		
T4	312.5 - 300	Secondary Horizontal	L3x2 1/2x1/4	63	-0.78	7.02	11.1	Pass
		Inner Bracing	2L2x2 1/2x1/4x3/8	53	0.01	69.01	1.0	Pass
		Leg	L6x6x7/8	68	-64.19	253.32	25.3	Pass
							38.4 (b)	
		Diagonal	2L2 1/2x2 1/2x1/4x3/8	88	-15.12	21.60	70.0	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	84	-8.52	31.81	26.8	Pass
		Redund Horz 1	L2 1/2x2 1/2x3/16	86	-0.97	15.09	6.4	Pass
		Bracing						
Redund Diag 1	L2 1/2x2x3/16	83	-0.79	4.69	16.9	Pass		
T5	300 - 287.5	Inner Bracing	2L2x2 1/2x1/4x3/8	102	-0.02	3.55	1.1	Pass
		Leg	L6x6x7/8	105	-82.54	253.32	32.6	Pass
		Diagonal	2L2 1/2x2 1/2x5/16x3/8	125	-15.89	25.05	63.4	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	121	-10.20	26.71	38.2	Pass
		Redund Horz 1	L2 1/2x2 1/2x1/4	119	-1.24	18.49	6.7	Pass
		Bracing						
Redund Diag 1	L2 1/2x2 1/2x1/4	124	-0.96	8.41	11.4	Pass		

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
T6	287.5 - 275	Bracing							
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	139	-0.02	5.50	1.1	Pass	
		Leg	L6x6x7/8	142	-101.09	253.32	39.9	Pass	
								48.4 (b)	
		Diagonal	2L2 1/2x2 1/2x5/16x3/8	162	-16.46	23.23	70.9	Pass	
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	158	-10.97	22.98	47.7	Pass	
		Redund Horiz 1	L2 1/2x2 1/2x1/4	156	-1.52	16.35	9.3	Pass	
		Bracing							
		Redund Diag 1	L2 1/2x2 1/2x1/4	157	-1.11	7.74	14.4	Pass	
		T7	275 - 262.5	Bracing					
Inner Bracing	2L2 1/2x2 1/2x1/4x3/8			176	-0.02	4.61	1.2	Pass	
Leg	L8x8x3/4			179	-119.76	327.61	36.6	Pass	
Diagonal	2L2 1/2x2 1/2x1/4x3/8			201	-17.11	30.68	55.8	Pass	
Horizontal	2L2 1/2x2 1/2x1/4x3/8			197	-11.84	20.23	58.6	Pass	
Redund Horiz 1	L2 1/2x2 1/2x3/16			193	-1.80	11.03	16.3	Pass	
Bracing									
Redund Diag 1	L2 1/2x2 1/2x3/16			200	-1.26	5.68	22.2	Pass	
Bracing									
Redund Hip 1	L3x3x1/4			195	-0.05	11.22	0.6	Pass	
T8	262.5 - 250	Bracing							
		Redund Hip Diagonal 1	2L2 1/2x2 1/2x1/4x3/8	196	-0.11	9.97	1.1	Pass	
		Bracing							
		Inner Bracing	2L2 1/2x2 1/2x3/16x3/8	221	-0.02	3.03	1.6	Pass	
		Leg	L8x8x3/4	224	-142.43	327.61	43.5	Pass	
								56.9 (b)	
		Diagonal	2L2 1/2x2 1/2x1/4x3/8	246	-19.68	28.93	68.0	Pass	
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	242	-14.20	17.73	80.1	Pass	
		Redund Horiz 1	L2 1/2x2 1/2x3/16	244	-2.14	9.40	22.8	Pass	
		Bracing							
Redund Diag 1	L2 1/2x2 1/2x3/16	239	-1.44	5.22	27.7	Pass			
T9	250 - 225	Bracing							
		Redund Hip 1	L3x3x1/4	260	-0.05	9.65	0.6	Pass	
		Bracing							
		Redund Hip Diagonal 1	2L2 1/2x2 1/2x1/4x3/8	241	-0.11	8.81	1.3	Pass	
		Bracing							
		Inner Bracing	2L2 1/2x2 1/2x3/16x3/8	266	-0.02	2.60	1.7	Pass	
		Leg	L8x8x7/8	269	-154.72	344.61	44.9	Pass	
								61.8 (b)	
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	303	-37.33	58.63	63.7	Pass	
								69.5 (b)	
T10	225 - 200	Horizontal	2L3x2 1/2x1/4x3/8	297	-16.34	24.69	66.2	Pass	
		Redund Horiz 1	2L1 3/4x1 3/4x3/16	290	-2.33	18.90	12.3	Pass	
		Bracing							
		Redund Horiz 2	2L2 1/2x2 1/2x1/4x3/8	291	-2.33	28.33	8.2	Pass	
		Bracing							
		Redund Diag 1	2L2x2x3/16	301	-2.35	11.88	19.8	Pass	
		Bracing							
		Redund Diag 2	2L2 1/2x2x3/16x3/8	307	-8.57	12.12	70.7	Pass	
		Bracing							
		Redund Hip 2	L3 1/2x3 1/2x5/16	325	-0.18	9.30	1.9	Pass	
T10	225 - 200	Bracing							
		Redund Hip Diagonal 2	2L2 1/2x2 1/2x1/4x3/8	296	-0.14	6.33	2.3	Pass	
		Bracing							
		Redund Sub Horiz	2L2 1/2x2 1/2x1/4x3/8	294	-10.01	20.40	49.1	Pass	
		Bracing							
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	331	-0.03	11.69	1.5	Pass	
		Leg	L8x8x1 1/8	334	-205.10	434.78	47.2	Pass	
								70.2 (b)	
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	368	-38.54	51.39	75.0	Pass	
		Horizontal	2L3x2 1/2x1/4x3/8	348	-18.92	51.94	36.4	Pass	
						42.6 (b)			

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 11 of 17
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	<b>Client</b> Transcend Wireless / T-Mobile	<b>Designed by</b> KM

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
T11	200 - 175	Redund Horz 1 Bracing	2L1 3/4x1 3/4x3/16	355	-3.09	17.87	17.3	Pass	
		Redund Horz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	365	-3.09	21.77	14.2	Pass	
		Redund Diag 1 Bracing	2L2x2x3/16	357	-2.83	10.92	25.9	Pass	
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	353	-6.04	10.35	58.4	Pass	
		Redund Hip 2 Bracing	L4x4x3/8	390	-0.20	12.87	1.5	Pass	
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	361	-0.14	5.15	2.8	Pass	
		Redund Sub Horz Bracing	2L2 1/2x2 1/2x1/4x3/8	359	-7.60	16.28	46.7	Pass	
		Inner Bracing	L3x3x1/4	396	-0.02	3.25	2.1	Pass	
		Leg	L8x8x1 1/8	399	-253.03	522.80	48.4	Pass	
		Diagonal	2L2.5x3.5x5/16 + 2L3x3.5x3/8	433	-42.82	70.20	75.8 (b)	Pass	
		Horizontal	2L3 1/2x2 1/2x1/4x3/8	413	-22.04	53.17	61.0	Pass	
								41.5	Pass
								49.3 (b)	
		Redund Horz 1 Bracing	2L1 3/4x1 3/4x3/16	420	-3.81	16.78	22.7	Pass	
		Redund Horz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	421	-3.81	17.25	22.1	Pass	
		Redund Diag 1 Bracing	2L2x2x3/16	422	-3.22	10.05	32.0	Pass	
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	418	-8.15	8.88	91.8	Pass	
		Redund Hip 2 Bracing	L4x4x3/8	455	-0.20	10.27	2.0	Pass	
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	426	-0.15	4.26	3.5	Pass	
		Redund Sub Horz Bracing	2L2 1/2x3x1/4x3/8	424	-10.97	14.08	77.9	Pass	
Inner Bracing	2L3x2 1/2x1/4x3/8	461	-0.04	12.07	1.8	Pass			

\*Elev. 175-351.67ft – Modelled in TnxTower.



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<b>Client</b>	Transcend Wireless / T-Mobile	<b>Designed by</b>	KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T12	175 - 150	*Legs - A	ST L808018	274.93	522.8	52.59	92.61	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L2.5x3x5/16 + 2L3x3x3/8	62.36	101.93	61.18	65.35	Pass
		*Horizontals - O / Added Redundant Braces	LD L35255 SP 0.4375	39.48	65	60.74	62.06	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.34	13.41	9.99	8.43	Pass
		*Red Diag 1 - D	ST L30303	1.47	8.13	18.09	9.24	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.375	1.84	53.8	3.42	5.78	Pass
		*Red Diag 2 - L	LD L30306 SP 0.4375	26.76	37.98	70.46	42.06	Pass
		*Red Sub Diagonal - M / New Reinforcement	2L3x2.5x1/4 + L3.5x2.5x3/8	41.38	59.54	69.5	43.36	Pass
		*Red Vertical - N	ST L30304	0.02	11.34	0.18	0.13	Pass
		*Red Sub Horizontal - F / Bolt Replacement	LD L30304 SP 0.4375	32.3	46.52	69.43	40.62	Pass
		*Hip Horizontal 2 - G	LD L40304 SP 0.375	3.5	89.16	3.93	11	Pass
		*Hip Diagonal 2 - K	LD L25254 SP 0.375	6.24	16.99	36.73	19.62	Pass
		*Hip Horiz 2 Sub Braces - H (LLV)	ST L30254	0.24	17.78	1.35	1.51	Pass
		*Level 1 Internal Sub Diagonals - J	ST L30304	2.28	13.17	17.31	14.34	Pass
		*Level 1 Internal Horizontal - I	LD L40304 SP 0.375	5.04	71.54	7.05	15.84	Pass
		*Level 2 Internal Corner Diagonals - Q	ST L30304	2.34	9.62	24.34	14.71	Pass
		*Level 2 Internal Middle Diagonals - S	ST L30304	2.34	9.42	24.85	14.71	Pass
		*Level 2 Internal Corner Diagonals Sub Braces - P	ST L30254	2.24	12.19	18.38	14.08	Pass
		*Level 2 Internal Horizontal - R	LD L40304 SP 0.375	2.16	46.83	4.61	6.79	Pass
T13	150 - 125	*Legs - A	ST L808018	284.8	522.39	54.52	80.55	Pass
		*Diagonals - B / Reinforcement / Bolt Replacement	2L3x3.5x3/8 + 2L3x3.5x3/8	91.14	105.63	86.28	81.86	Pass
		*Horizontals - K / Added Redundant Braces	LD L35305 SP 0.4375	59.73	80.3	74.38	93.89	Pass
		*Red Horiz 1 - C (LLV)	ST L25204	1.79	22.08	8.11	11.25	Pass
		*Red Diag 1 - D	ST L30303	2.4	8.65	27.74	15.09	Pass
		*Red Horiz 2 - E	SD L25203 SP 0.375	5.91	16.82	35.14	18.58	Pass
		*Red Diag 2 - I / Replace Existing	LD L35356 SP 0.4375	56.95	71.18	80.01	89.52	Pass
		*Red Sub Diagonal - J / New Reinf. - Replace Bolts	2L3x2.5x1/4 + L3.5x2.5x3/8	47.08	55.38	85.01	39.47	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	42.53	55.51	76.61	66.85	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0	23.37	0	0	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0.01	16.35	0.06	0.03	Pass
		*Internal Corner Diagonals - M (LLH)	ST L35304	1.77	10.39	17.04	11.13	Pass
		*Internal Middle Diagonals - N (LLV)	ST L35304	1.55	9.45	16.41	9.75	Pass
		*Internal Corner Diagonals Sub Braces - L (LLV)	ST L30254	4.93	10.42	47.33	31	Pass
		*Internal Horizontal - O (LLV)	LD L40304 SP 0.375	3.83	39.7	9.65	12.04	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T14	125 - 100	*Legs - A / Replace Bolts @ 103.5ft Approx.	ST L808016	362	497.74	72.73	47.78	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L3x3.5x3/8 + 2L3x3.5x3/8	82.88	92.98	89.14	52.11	Pass
		*Horizontals - K / Added Redundant Braces	LD L40355 SP 0.4375	60.93	92.83	65.64	76.62	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.52	12.93	11.75	9.56	Pass
		*Red Diag 1 - D	ST L30303	1.71	8.03	21.3	10.75	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.4375	2.05	26.66	7.69	6.44	Pass
		*Red Diag 2 - I	LD L35356 SP 0.4375	49.74	63.66	78.13	78.19	Pass
		*Red Sub Diagonal - J / New Reinforcement	2L3x3x3/8 + L3.5x3x3/8	49.02	102.21	47.96	51.37	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	46.24	56.75	81.48	48.46	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0.01	14.86	0.07	0.03	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0	15.07	0	0	Pass
		*Internal Corner Diagonals - M	ST L35354	3.09	10.55	29.29	19.43	Pass
		*Internal Middle Diagonals - N	ST L35354	2.75	10.93	25.15	17.29	Pass
		*Internal Corner Diagonals Sub Braces - L	ST L35354	6.55	17.07	38.37	41.18	Pass
		*Internal Horizontal - O	LD L40354 SP 0.375	5.32	37.75	14.09	16.73	Pass
T15	100 - 75	*Legs - A / Replace Bolts @ 78.5ft Approx.	ST L808016	470.28	497.74	94.48	54.31	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	63.61	139	45.76	79.99	Pass
		*Horizontals - Q / New Reinforcement	2L3.5x3x5/16 + L4x3.5x3/8	49.81	97.93	50.87	78.3	Pass
		*Red Horiz 1 - C	ST L25253	1.46	9.37	15.58	9.18	Pass
		*Red Diag 1 - D	LD L25253 SP 0.375	1.21	15.4	7.86	3.8	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.5	1.83	40.09	4.56	5.75	Pass
		*Red Diag 2 - M / Replace Existing Member	LD L35356 SP 0.4375	25.59	38	67.34	40.22	Pass
		*Red Sub Diagonal - O	LD L40408 SP 0.4375	63.65	75.65	84.13	40.02	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	17.99	24.98	72.01	56.56	Pass
		*Red Vertical Outside - N	ST L25254	0.05	6.48	0.77	0.31	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.07	7.1	0.99	0.44	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.05	49.46	0.1	0.16	Pass
		*Hip Diagonal 2 - J	LD L25254 SP 0.375	0.01	33.01	0.03	0.03	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0	6.63	0	0	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	7.1	0	0	Pass
		*Hip SubInternal 2 - H	ST L25253	0	8.1	0	0	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Internal Corner Horizontal 1 - V	ST L30303	0.07	10.18	0.69	0.44	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.05	8.8	0.57	0.31	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	4.27	40.08	10.65	13.42	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.41	43.73	5.51	7.58	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	3.92	7.82	50.1	24.65	Pass
		*Internal Corner Horizontal 3 - R	LD L35254 SP 0.4375	5.99	53.92	11.11	18.83	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	5.55	47.01	11.81	17.45	Pass
T16	75 - 50	*Legs - A / Add Redundants / Replace Bolts	ST L808016	530.96	625.5	84.89	54.51	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	65.13	140.71	46.29	81.9	Pass
		*Horizontals - Q / New Reinforcement	2L4x3x1/4 + L4x3.5x3/8	52.94	76.37	69.32	66.57	Pass
		*Red Horiz 1 - C	ST L25253	1.14	8.72	13.07	7.17	Pass
		*Red Diag 1 - D	LD L25254 SP 0.375	5.1	38.59	13.22	16.03	Pass
		*Red Horiz 2 - E	LD L30254 SP 0.5	2.25	51.49	4.37	7.07	Pass
		*Red Diag 2 - M	LD L35356 SP 0.4375	27.82	70.68	39.36	62.97	Pass
		*Red Sub Diagonal - O / New Reinforcement	2L4x4x1/2 + L4x4x3/8	66.06	163.61	40.38	41.54	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	18.96	21.93	86.44	59.61	Pass
		*Red Vertical Outside - N	ST L25254	0.06	6.48	0.93	0.38	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.1	6.19	1.62	0.63	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.06	46.3	0.13	0.19	Pass
		*Hip Diagonal 2 - J	LD L25254	0.03	29.89	0.1	0.09	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0.01	5.97	0.17	0.06	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	6.19	0	0	Pass
		*Hip SubInternal 2 - H	ST L25253	0	7.06	0	0	Pass
		*Internal Corner Horizontal 1 - V	ST L30303	0.06	12.27	0.49	0.38	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.05	7.25	0.69	0.31	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	5.06	37.03	13.66	15.91	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.91	40.52	7.18	9.15	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	4.95	6.77	73.08	31.12	Pass
		*Internal Corner Horizontal 3 - R	LD L40356 SP 0.375	5.95	106.7	5.58	18.71	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	7.02	43.03	16.32	22.07	Pass
T17	50 - 25	*Legs - A / Replace Bolts @ 28.5ft Approx.	ST L808016	595.98	625.11	95.34	61.18	Pass
		*Diagonals - B	2L3x4x3/8 + 2L3x4x3/8	69.23	129.59	53.42	87.06	Pass
		*Horizontals - X / New Reinforcement	2L4x3x5/16 +	57.42	79.09	72.6	72.21	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
			L4x3.5x3/8					
		*Red Horiz 1 - E	ST L25254	1.35	9.95	13.56	8.49	Pass
		*Red Diag 1 - G	LD L25253 SP 0.4375	5.25	36.86	14.24	16.5	Pass
		*Red Horiz 2 - M	LD L25254 SP 0.5	3.43	33.58	10.21	10.78	Pass
		*Red Diag 2 - T	LD L35356 SP 0.4375	30.72	92.25	33.3	48.29	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.69	24.86	10.82	16.91	Pass
		*Red Sub Diag 1 - D	ST L25254	2.88	15.38	18.73	26.08	Pass
		*Red Sub Diag 2 - F	ST L25254	5.08	13.28	38.24	46	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.75	24.85	19.11	43.01	Pass
		*Red Sub Diag 3 - R	ST L25254	2.21	5.78	38.26	20.01	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.93	8.06	36.34	26.53	Pass
		*Red Sub Diagonal - V / New Reinforcement	2L4x4x1/2 + L4x4x3/8	70.52	151.83	46.45	44.34	Pass
		*Red Sub Horizontal - N / Add Kicker Internal	SD L40304 SP 0.5	21	21.43	98.02	66.02	Pass
		*Red Vertical Outside - U	ST L25254	0.06	6.48	0.93	0.38	Pass
		*Red Vertical Center - W	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - I	ST L40406	0.09	24.95	0.36	0.57	Pass
		*Hip Horizontal 2 - J	LD L35255 SP 0.375	0.07	52.43	0.13	0.22	Pass
		*Hip Diagonal 2 - O	LD L25254 SP 0.375	0.01	27.15	0.04	0.03	Pass
		*Hip SubDiagonal 2 - Q	ST L25253	0.01	5.4	0.19	0.06	Pass
		*Hip SubVertical 2 - P	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - K	ST L30304	0	7.09	0	0	Pass
		*Hip SubInternal 2 - L	ST L25253	0	6.21	0	0	Pass
		*Internal Corner Horizontal 1 - C1	ST L30304	0.06	12.37	0.49	0.38	Pass
		*Internal Corner Diagonal 1 - B1	ST L30304	0.04	14.78	0.27	0.25	Pass
		*Internal Corner Horizontal 2 - A1	LD L30254 SP 0.375	5.07	32.65	15.53	15.94	Pass
		*Internal Corner Diagonal 2 - Z	LD L25254 SP 0.375	2.95	34.24	8.62	9.27	Pass
		*Internal Corner Diagonal 2 - D1	LD L25253 SP 0.375	4.95	15.55	31.83	15.56	Pass
		*Internal Corner Horizontal 3 - Y	LD L35255 SP 0.4375	5.73	56.66	10.11	18.01	Pass
		*Internal Corner Diagonal 3 - E1	LD L30304 SP 0.4375	7	39.65	17.65	22.01	Pass
T18	25 - 0	*Legs - A / Replace Splice Bolts @ 3.5ft Approx.	ST L808018	664.15	696.49	95.36	61.36	Pass
		*Diagonals - B	SD L60406 SP 0.5	69.15	102.1	67.73	74.54	Pass
		*Horizontals - L1	LD L50356 SP 0.4375	58.41	94.96	61.51	73.45	Pass
		*Red Horiz 1 - E	ST L25254	1.44	9.94	14.49	9.05	Pass
		*Red Diag 1 - G	LD L25254 SP 0.5	5.01	46.82	10.7	15.75	Pass
		*Red Horiz 2 - O	LD L35256 SP 0.4375	6.03	66.02	9.13	18.96	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Red Diag 2 - T	LD L35356 SP 0.4375	30.82	89.22	34.55	32.3	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.93	23.56	12.44	26.53	Pass
		*Red Sub Diag 1 - D	ST L25254	3.31	14.67	22.57	29.97	Pass
		*Red Sub Diag 2 - F	ST L25254	4.81	12.57	38.26	43.55	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.56	23.56	19.36	41.29	Pass
		*Red Sub Diag 3 - R	ST L25254	1.87	5.31	35.2	16.93	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.4	7.18	33.42	21.73	Pass
		*Red Sub Diagonal - V	LD L50506 SP 0.4375	61.33	155.95	39.33	28.33	Pass
		*Red Sub Horizontal - Q	ST C9X13	27.23	28.94	94.09	10.7	Pass
		*Red Vertical Outside - U	ST L25254	5.9	6.45	91.46	37.1	Pass
		*Red Vertical Center - Z	LD L30254 SP 0.5	0.03	43.37	0.07	0.09	Pass
		*Red Vertical Inner 1 - X	LD L25254 SP 0.375	15.17	51.22	29.62	47.69	Pass
		*Red Vertical Inner 2 - Y / Reinforcement DBL L	LD L30304 SP 0.5	18.97	37.02	51.25	59.64	Pass
		*Red Vertical Sub Diagonal - W	LD L25254 SP 0.5	18.47	20.49	90.12	58.07	Pass
		*Hip Horizontal 1 - I	ST L40406	0.12	22.23	0.54	0.75	Pass
		*Hip Diagonal 1 - J	LD L25254 SP 0.5	0.11	14.43	0.76	0.35	Pass
		*Hip Horizontal 2 - L	LD L35354 SP 0.4375	2.67	46.21	5.78	8.39	Pass
		*Hip Diagonal 2 - A1	LD L25254 SP 0.375	1.75	24.81	7.05	5.5	Pass
		*Hip SubDiagonal 2 - C1	ST L25253	0	4.86	0	0	Pass
		*Hip SubVertical 2 - B1	ST L25253	0	17.08	0	0	Pass
		*Hip SubInternal 2-1 - KK	LD L25253 SP 0.4375	3.65	24.2	15.08	11.47	Pass
		*Hip SubInternal 2-2 - K / Reinforcement DBL L	LD L25253 SP 0.4375	6.1	22.07	27.64	19.18	Pass
		*Internal-1 Sub Braces - N	ST L30304	1.97	8.94	22.02	12.39	Pass
		*Internal-1 Inner Horiz - M	LD L60355 SP 0.375	8.05	85.5	9.42	25.31	Pass
		*Internal-2 Corner Horizontal 1 - H1	LD L25253 SP 0.4375	0.11	27.08	0.41	0.35	Pass
		*Internal-2 Corner Diagonal 1 - G1	ST L25254	0.07	7.05	0.99	0.44	Pass
		*Internal-2 Corner Horizontal 2 - F1	LD L30254 SP 0.375	3.73	28.87	12.92	11.73	Pass
		*Internal-2 Corner Diagonal 2-1 - E1	LD L25254 SP 0.375	2.01	30.15	6.67	6.32	Pass
		*Internal-2 Corner Diagonal 2-2 - I1	LD L25253 SP 0.4375	3.09	13.74	22.49	9.71	Pass
		*Internal-2 Corner Horizontal 3 - D1	LD L35255 SP 0.4375	4.57	51.65	8.85	14.37	Pass
		*Internal-2 Corner Diagonal 3 - K2	LD L30254 SP 0.5	4.32	48.03	8.99	13.58	Pass
		*Internal-2 Corner Diagonal 3 - Sub1 - J1	ST L30304	0.17	12.76	1.33	1.07	Pass
		*Internal-2 Corner Diagonal 3 - Sub2 - K1	LD L30304 SP 0.5	0.01	53.07	0.02	0.03	Pass
T12	175-150	Reinforcement / Redundant Vertical / RV12	ST L25254	0.12	6.27	1.92	1.09	Pass
		Reinforcement / Internal / RI12	ST L25254	0.9	10.93	8.23	8.15	Pass

<b>tnxTower</b>  <b>Malouf Engineering Int'l Inc.</b> 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	<b>Job</b> 350ft SST / Norwalk Willard RD Site #CT11011D	<b>Page</b> 17 of 17
	<b>Project</b> CT04761S-20V1	<b>Date</b> 16:11:42 07/29/20
	<b>Client</b> Transcend Wireless / T-Mobile	<b>Designed by</b> KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T13	150-125	Reinforcement / Redundant Vertical / RV13	ST L25254	0.21	6.44	3.26	1.9	Pass
		Reinforcement / Internal / RI13	ST L25254	1.26	9.6	13.13	11.41	Pass
		Reinforcement / Internal Kicker / RK13	ST L30304	0.01	6.34	0.16	0.06	Pass
T14	100-125	Reinforcement / Redundant Vertical / RV14	ST L30304	0.18	11.39	1.58	1.13	Pass
		Reinforcement / Internal / RI14	ST L30304	1.11	13.08	8.49	6.98	Pass
		Reinforcement / Internal Kicker / RK14	ST L30304	0.02	5.67	0.35	0.13	Pass
T15	75-100	Reinforcement / Internal Kicker / RK15	ST L30304	0.01	6.83	0.15	0.06	Pass
T16	50-75	Reinforcement / Internal Kicker / RK16	ST L30304	0.01	6.46	0.15	0.06	Pass
		*Reinforcement / Red Sub Horiz 1 - C16	ST L25254	2.19	26.21	8.36	13.77	Pass
		*Reinforcement / Red Sub Diag 1 - D16	ST L25254	2.68	16.14	16.61	16.85	Pass
		*Reinforcement / Red Sub Diag 2 - F16	ST L25254	4.88	14.04	34.76	30.68	Pass
		*Reinforcement / Red Sub Horiz 2 - H16	ST L25254	4.23	26.21	16.14	26.6	Pass
		*Reinforcement / Red Sub Diag 3 - R16	ST L25254	1.86	6.35	29.3	11.69	Pass
		*Reinforcement / Red Sub Horiz 3 - S16	ST L25254	2.13	9.17	23.23	13.39	Pass
T17	25-50	*Reinforcement / Internal Kicker / RK17	ST L30304	0.01	6.11	0.16	0.06	Pass
T9	250-225	Red Horiz 1 - C	ST L25203	2.22	12.37	17.95	13.96	Pass
		Red Diag 1 - D	ST L30303	2.24	8.45	26.52	14.08	Pass
T10	225-200	Red Horiz 1 - C	ST L25204	2.84	12.61	22.53	17.86	Pass
		Red Diag 1 - D	ST L30303	2.6	7.77	33.45	16.35	Pass
T11	200-175	Red Horiz 1 - C	ST L25253	3.52	11.5	30.6	22.13	Pass
		Red Diag 1 - D	ST L30304	2.98	9.31	32	18.74	Pass

\*Elev. 0-175ft – Tower modelled in Staad. Tower Members were considered as truss members and Loads are from Staad Analysis.



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Job No  
**CT04761S-20V**

Sheet No  
**1**

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**0**

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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32

## Job Information

	Engineer	Checked	Approved
<b>Name:</b>	KM	LKN	MM
<b>Date:</b>	29-Jul-20	29-Jul-20	29-Jul-20

<b>Project ID</b>	
<b>Project Name</b>	

### Comments

NORWALK WILLARD RD SITE #CT11011D  
T-MOBILE APPURTENANCE CHANGES - ELEV. 262FT  
2018 CT SBC / 2015 IBC / ANSI/TIA-222-G  
Vult=120MPH / Vasd=93MPH / 50MPH + 3/4" ICE / Vservice=60MPH  
EXPOSURE 'C' / CLASS 'II' / TOPO 1  
0 to 175ft of Tower Modelled

<b>Structure Type</b>	SPACE FRAME
-----------------------	-------------

Number of Nodes	804	Highest Node	820
Number of Elements	2008	Highest Beam	2024

Number of Basic Load Cases	-2
Number of Combination Load Cases	0

### Included in this printout are data for:

<b>All</b>	The Whole Structure
------------	---------------------

### Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD ONLY
Primary	2	1.2 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	3	0.9 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	4	1.2 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	5	0.9 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	6	1.2 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	7	0.9 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	8	1.2 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	9	0.9 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	10	1.2 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	11	0.9 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	12	1.2 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	13	0.9 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	14	1.2 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	15	0.9 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	16	1.2 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	17	0.9 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	18	1.2 DEAD+1.0 ICE+1.0 TEMP



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Job No  
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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

Date 29-Jul-20

Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std

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## Job Information Cont...

Type	L/C	Name
Primary	22	1.2 DEAD+1.0 WIND 135 DEG+1.0 ICE+1
Primary	23	1.2 DEAD+1.0 WIND 180 DEG+1.0 ICE+1
Primary	24	1.2 DEAD+1.0 WIND 225 DEG+1.0 ICE+1
Primary	25	1.2 DEAD+1.0 WIND 270 DEG+1.0 ICE+1
Primary	26	1.2 DEAD+1.0 WIND 315 DEG+1.0 ICE+1
Primary	27	DEAD+WIND 0 DEG - SERVICE
Primary	28	DEAD+WIND 45 DEG - SERVICE
Primary	29	DEAD+WIND 90 DEG - SERVICE
Primary	30	DEAD+WIND 135 DEG - SERVICE
Primary	31	DEAD+WIND 180 DEG - SERVICE
Primary	32	DEAD+WIND 225 DEG - SERVICE
Primary	33	DEAD+WIND 270 DEG - SERVICE
Primary	34	DEAD+WIND 315 DEG - SERVICE

## Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	476	6:1.2 DEAD+1.	<b>6.645</b>	-1.052	0.064	6.728	-0.000	-0.001	-0.004
Min X	478	15:0.9 DEAD+1.	<b>-6.626</b>	-0.937	0.078	6.693	-0.000	0.001	0.004
Max Y	423	5:0.9 DEAD+1.	2.809	<b>0.767</b>	-2.864	4.084	-0.003	-0.000	-0.003
Min Y	476	4:1.2 DEAD+1.	4.987	<b>-1.368</b>	-4.929	7.144	-0.003	-0.000	-0.003
Max Z	474	11:0.9 DEAD+1	-0.044	-0.922	<b>6.597</b>	6.661	0.004	-0.001	-0.000
Min Z	476	2:1.2 DEAD+1.	-0.033	-1.045	<b>-6.629</b>	6.711	-0.004	0.001	-0.000
Max rX	798	8:1.2 DEAD+1.	0.850	-0.747	1.013	1.519	<b>0.015</b>	0.016	-0.004
Min rX	798	17:0.9 DEAD+1.	-0.901	0.435	-1.034	1.439	<b>-0.011</b>	-0.011	0.003
Max rY	798	8:1.2 DEAD+1.	0.850	-0.747	1.013	1.519	0.015	<b>0.016</b>	-0.004
Min rY	795	12:1.2 DEAD+1.	-0.898	-0.736	0.983	1.521	0.015	<b>-0.016</b>	0.004
Max rZ	462	14:1.2 DEAD+1.	-4.464	0.301	-0.094	4.475	-0.000	0.001	<b>0.006</b>
Min rZ	467	6:1.2 DEAD+1.	4.461	0.317	-0.091	4.473	-0.000	-0.001	<b>-0.006</b>
Max Rst	476	16:1.2 DEAD+1.	-5.054	-0.409	-5.104	<b>7.195</b>	-0.003	0.001	0.002





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**3**

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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32

## Reactions

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
224	1:DEAD ONLY	10.098	108.958	-10.233	0.000	0.000	0.000
	2:1.2 DEAD+1.	-25.719	-270.777	60.482	0.000	0.000	0.000
	3:0.9 DEAD+1.	-28.740	-303.369	63.546	0.000	0.000	0.000
	4:1.2 DEAD+1.	-70.723	-474.178	71.490	0.000	0.000	0.000
	5:0.9 DEAD+1.	-73.745	-506.748	74.550	0.000	0.000	0.000
	6:1.2 DEAD+1.	-59.971	-270.741	25.961	0.000	0.000	0.000
	7:0.9 DEAD+1.	-62.997	-303.333	29.020	0.000	0.000	0.000
	8:1.2 DEAD+1.	-13.580	130.847	-38.062	0.000	0.000	0.000
	9:0.9 DEAD+1.	-16.610	98.213	-35.002	0.000	0.000	0.000
	10:1.2 DEAD+1.	49.886	531.751	-84.959	0.000	0.000	0.000
	11:0.9 DEAD+1.	46.856	499.076	-81.895	0.000	0.000	0.000
	12:1.2 DEAD+1.	94.969	735.114	-95.898	0.000	0.000	0.000
	13:0.9 DEAD+1.	91.940	702.415	-92.831	0.000	0.000	0.000
	14:1.2 DEAD+1.	84.150	531.894	-50.534	0.000	0.000	0.000
	15:0.9 DEAD+1.	81.124	499.219	-47.466	0.000	0.000	0.000
	16:1.2 DEAD+1.	37.727	130.167	13.606	0.000	0.000	0.000
	17:0.9 DEAD+1.	34.705	97.533	16.673	0.000	0.000	0.000
	18:1.2 DEAD+1.	23.445	252.049	-23.626	0.000	0.000	0.000
	19:1.2 DEAD+1.	11.323	126.078	-1.666	0.000	0.000	0.000
	20:1.2 DEAD+1.	-1.808	64.256	1.894	0.000	0.000	0.000
	21:1.2 DEAD+1.	2.058	128.144	-11.587	0.000	0.000	0.000
	22:1.2 DEAD+1.	16.244	252.175	-30.873	0.000	0.000	0.000
	23:1.2 DEAD+1.	35.548	377.995	-45.589	0.000	0.000	0.000
	24:1.2 DEAD+1.	48.707	439.816	-49.124	0.000	0.000	0.000
	25:1.2 DEAD+1.	44.822	375.969	-35.683	0.000	0.000	0.000
	26:1.2 DEAD+1.	30.627	251.892	-16.370	0.000	0.000	0.000
	27:DEAD+WIN	0.303	4.835	8.605	0.000	0.000	0.000
	28:DEAD+WIN	-11.323	-47.691	11.425	0.000	0.000	0.000
	29:DEAD+WIN	-8.565	4.862	-0.329	0.000	0.000	0.000
	30:DEAD+WIN	3.425	108.531	-16.813	0.000	0.000	0.000
	31:DEAD+WIN	19.817	212.041	-28.882	0.000	0.000	0.000
	32:DEAD+WIN	31.479	264.575	-31.673	0.000	0.000	0.000
	33:DEAD+WIN	28.697	212.069	-19.969	0.000	0.000	0.000
	34:DEAD+WIN	16.694	108.338	-3.452	0.000	0.000	0.000
227	1:DEAD ONLY	-10.060	110.808	-10.444	0.000	0.000	0.000
	2:1.2 DEAD+1.	24.494	-270.414	61.767	0.000	0.000	0.000
	3:0.9 DEAD+1.	27.505	-303.594	64.897	0.000	0.000	0.000
	4:1.2 DEAD+1.	-38.798	130.758	14.729	0.000	0.000	0.000
	5:0.9 DEAD+1.	-35.786	97.537	17.863	0.000	0.000	0.000
	6:1.2 DEAD+1.	-84.118	534.066	-50.794	0.000	0.000	0.000
	7:0.9 DEAD+1.	-81.103	500.802	-47.659	0.000	0.000	0.000
	8:1.2 DEAD+1.	-93.787	738.890	-97.549	0.000	0.000	0.000
	9:0.9 DEAD+1.	-90.769	705.607	-94.415	0.000	0.000	0.000
	10:1.2 DEAD+1.	-48.658	536.329	-86.817	0.000	0.000	0.000



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32

## Reactions Cont...

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
	11:0.9 DEAD+1	-45.639	503.067	-83.686	0.000	0.000	0.000
	12:1.2 DEAD+1	14.726	134.960	-39.710	0.000	0.000	0.000
	13:0.9 DEAD+1	17.744	101.740	-36.583	0.000	0.000	0.000
	14:1.2 DEAD+1	59.951	-268.093	25.704	0.000	0.000	0.000
	15:0.9 DEAD+1	62.967	-301.272	28.830	0.000	0.000	0.000
	16:1.2 DEAD+1	69.613	-473.200	72.592	0.000	0.000	0.000
	17:0.9 DEAD+1	72.625	-506.358	75.719	0.000	0.000	0.000
	18:1.2 DEAD+1	-23.329	262.131	-24.750	0.000	0.000	0.000
	19:1.2 DEAD+1	-11.979	135.287	-1.857	0.000	0.000	0.000
	20:1.2 DEAD+1	-31.081	261.437	-16.841	0.000	0.000	0.000
	21:1.2 DEAD+1	-44.733	386.236	-36.845	0.000	0.000	0.000
	22:1.2 DEAD+1	-48.050	450.689	-50.960	0.000	0.000	0.000
	23:1.2 DEAD+1	-34.698	388.998	-47.634	0.000	0.000	0.000
	24:1.2 DEAD+1	-15.566	262.797	-32.645	0.000	0.000	0.000
	25:1.2 DEAD+1	-1.939	138.063	-12.660	0.000	0.000	0.000
	26:1.2 DEAD+1	1.374	73.563	1.483	0.000	0.000	0.000
	27:DEAD+WIN	-0.569	6.269	8.798	0.000	0.000	0.000
	28:DEAD+WIN	-16.929	109.982	-3.340	0.000	0.000	0.000
	29:DEAD+WIN	-28.669	214.266	-20.239	0.000	0.000	0.000
	30:DEAD+WIN	-31.166	267.252	-32.314	0.000	0.000	0.000
	31:DEAD+WIN	-19.501	214.850	-29.545	0.000	0.000	0.000
	32:DEAD+WIN	-3.102	111.070	-17.400	0.000	0.000	0.000
	33:DEAD+WIN	8.606	6.872	-0.527	0.000	0.000	0.000
	34:DEAD+WIN	11.097	-46.163	11.580	0.000	0.000	0.000
230	1:DEAD ONLY	-10.616	116.118	10.483	0.000	0.000	0.000
	2:1.2 DEAD+1.	-49.324	542.814	86.881	0.000	0.000	0.000
	3:0.9 DEAD+1.	-46.140	507.988	83.739	0.000	0.000	0.000
	4:1.2 DEAD+1.	-96.537	747.197	95.834	0.000	0.000	0.000
	5:0.9 DEAD+1.	-93.354	712.349	92.690	0.000	0.000	0.000
	6:1.2 DEAD+1.	-87.200	542.613	48.716	0.000	0.000	0.000
	7:0.9 DEAD+1.	-84.020	507.788	45.570	0.000	0.000	0.000
	8:1.2 DEAD+1.	-41.623	138.843	-16.462	0.000	0.000	0.000
	9:0.9 DEAD+1.	-38.447	104.058	-19.607	0.000	0.000	0.000
	10:1.2 DEAD+1	23.825	-264.405	-61.740	0.000	0.000	0.000
	11:0.9 DEAD+1	27.000	-299.148	-64.881	0.000	0.000	0.000
	12:1.2 DEAD+1	71.122	-468.921	-70.647	0.000	0.000	0.000
	13:0.9 DEAD+1	74.298	-503.642	-73.785	0.000	0.000	0.000
	14:1.2 DEAD+1	61.760	-264.382	-23.623	0.000	0.000	0.000
	15:0.9 DEAD+1	64.939	-299.124	-26.760	0.000	0.000	0.000
	16:1.2 DEAD+1	16.142	139.742	41.690	0.000	0.000	0.000
	17:0.9 DEAD+1	19.324	104.957	38.552	0.000	0.000	0.000
	18:1.2 DEAD+1	-25.045	278.523	24.866	0.000	0.000	0.000
	19:1.2 DEAD+1	-36.363	405.219	47.744	0.000	0.000	0.000
	20:1.2 DEAD+1	-50.598	467.383	50.251	0.000	0.000	0.000



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Job No  
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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32

## Reactions Cont...

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
	21:1.2 DEAD+1	-47.566	403.134	35.880	0.000	0.000	0.000
	22:1.2 DEAD+1	-33.709	278.405	16.157	0.000	0.000	0.000
	23:1.2 DEAD+1	-13.733	151.855	2.000	0.000	0.000	0.000
	24:1.2 DEAD+1	0.511	89.669	-0.506	0.000	0.000	0.000
	25:1.2 DEAD+1	-2.521	153.896	13.848	0.000	0.000	0.000
	26:1.2 DEAD+1	-16.389	278.696	33.600	0.000	0.000	0.000
	27:DEAD+WIN	-19.926	219.301	29.597	0.000	0.000	0.000
	28:DEAD+WIN	-32.077	272.117	31.938	0.000	0.000	0.000
	29:DEAD+WIN	-29.655	219.269	19.802	0.000	0.000	0.000
	30:DEAD+WIN	-17.913	115.016	2.979	0.000	0.000	0.000
	31:DEAD+WIN	-1.066	10.908	-8.727	0.000	0.000	0.000
	32:DEAD+WIN	11.095	-41.935	-11.067	0.000	0.000	0.000
	33:DEAD+WIN	8.675	10.879	1.047	0.000	0.000	0.000
	34:DEAD+WIN	-3.081	115.212	17.903	0.000	0.000	0.000
233	1:DEAD ONLY	10.578	113.307	10.194	0.000	0.000	0.000
	2:1.2 DEAD+1	50.448	536.740	84.914	0.000	0.000	0.000
	3:0.9 DEAD+1	47.274	502.764	81.861	0.000	0.000	0.000
	4:1.2 DEAD+1	-15.054	134.586	39.931	0.000	0.000	0.000
	5:0.9 DEAD+1	-18.226	100.651	36.881	0.000	0.000	0.000
	6:1.2 DEAD+1	-61.789	-267.576	-23.990	0.000	0.000	0.000
	7:0.9 DEAD+1	-64.958	-301.469	-27.039	0.000	0.000	0.000
	8:1.2 DEAD+1	-72.271	-470.217	-69.581	0.000	0.000	0.000
	9:0.9 DEAD+1	-75.436	-504.089	-72.631	0.000	0.000	0.000
	10:1.2 DEAD+1	-25.160	-265.314	-60.464	0.000	0.000	0.000
	11:0.9 DEAD+1	-28.324	-299.206	-63.517	0.000	0.000	0.000
	12:1.2 DEAD+1	40.439	137.210	-15.393	0.000	0.000	0.000
	13:0.9 DEAD+1	37.274	103.276	-18.450	0.000	0.000	0.000
	14:1.2 DEAD+1	87.121	538.943	48.353	0.000	0.000	0.000
	15:0.9 DEAD+1	83.952	504.967	45.295	0.000	0.000	0.000
	16:1.2 DEAD+1	97.587	741.653	94.055	0.000	0.000	0.000
	17:0.9 DEAD+1	94.415	707.656	90.998	0.000	0.000	0.000
	18:1.2 DEAD+1	24.929	265.485	23.509	0.000	0.000	0.000
	19:1.2 DEAD+1	37.083	391.605	45.480	0.000	0.000	0.000
	20:1.2 DEAD+1	16.877	265.113	31.550	0.000	0.000	0.000
	21:1.2 DEAD+1	2.392	140.676	12.438	0.000	0.000	0.000
	22:1.2 DEAD+1	-1.254	76.920	-1.237	0.000	0.000	0.000
	23:1.2 DEAD+1	12.769	139.341	1.531	0.000	0.000	0.000
	24:1.2 DEAD+1	32.987	265.908	15.490	0.000	0.000	0.000
	25:1.2 DEAD+1	47.467	390.262	34.559	0.000	0.000	0.000
	26:1.2 DEAD+1	51.107	454.039	48.260	0.000	0.000	0.000
	27:DEAD+WIN	20.234	215.461	28.835	0.000	0.000	0.000
	28:DEAD+WIN	3.351	111.459	17.178	0.000	0.000	0.000
	29:DEAD+WIN	-8.726	7.470	0.665	0.000	0.000	0.000
	30:DEAD+WIN	-11.470	-44.932	-11.069	0.000	0.000	0.000



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**CT04761S-20V**

Sheet No  
**6**

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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref  
By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32

### Reactions Cont...

Node	L/C	Horizontal			Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
	31:DEAD+WIN	0.649	8.069	-8.661	0.000	0.000	0.000
	32:DEAD+WIN	17.547	112.156	3.030	0.000	0.000	0.000
	33:DEAD+WIN	29.618	216.047	19.491	0.000	0.000	0.000
	34:DEAD+WIN	32.355	268.480	31.255	0.000	0.000	0.000



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**7**

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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

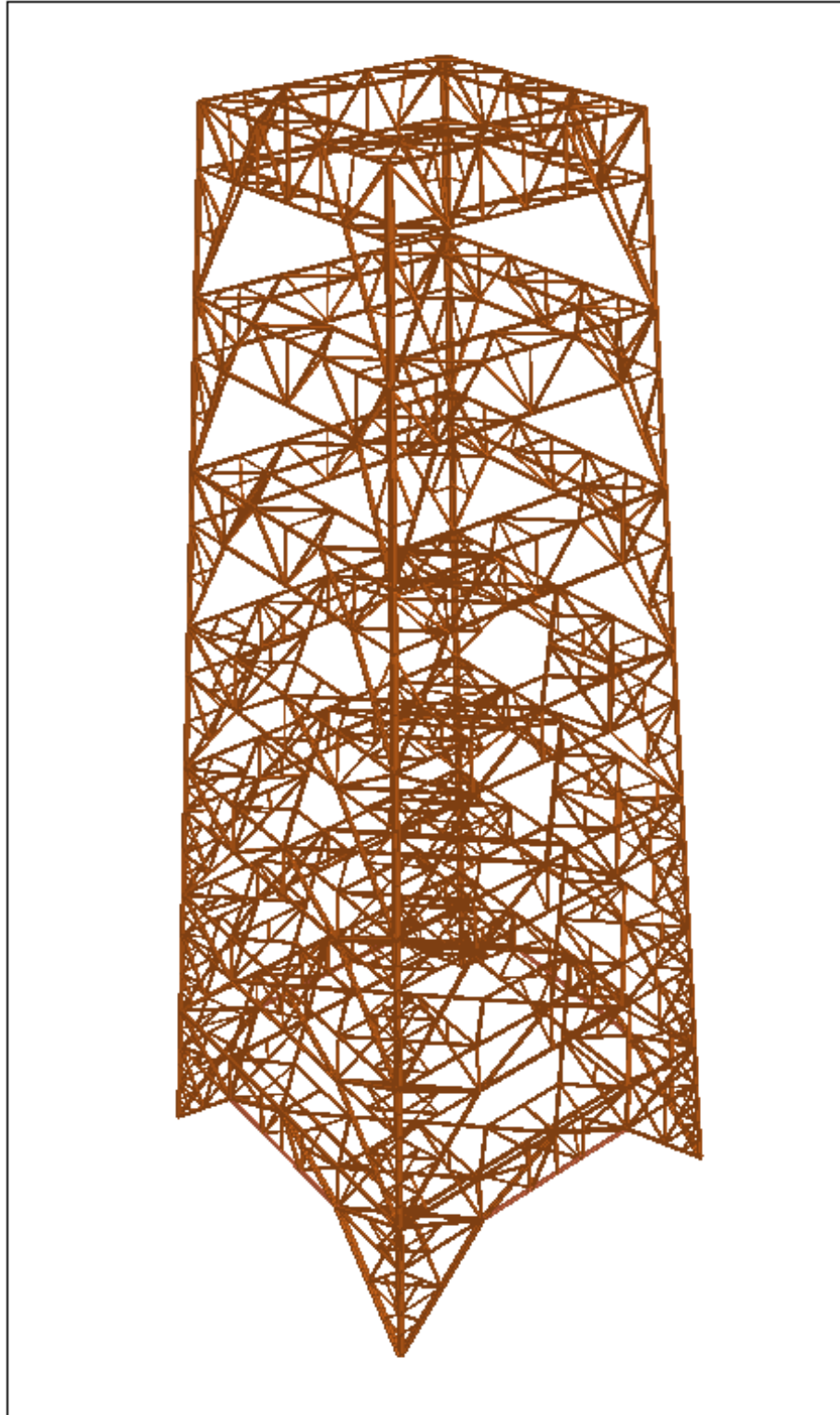
Date 29-Jul-20

Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std

Date/Time 29-Jul-2020 17:32



Structure 0 - 175ft (3D Rendered View)



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

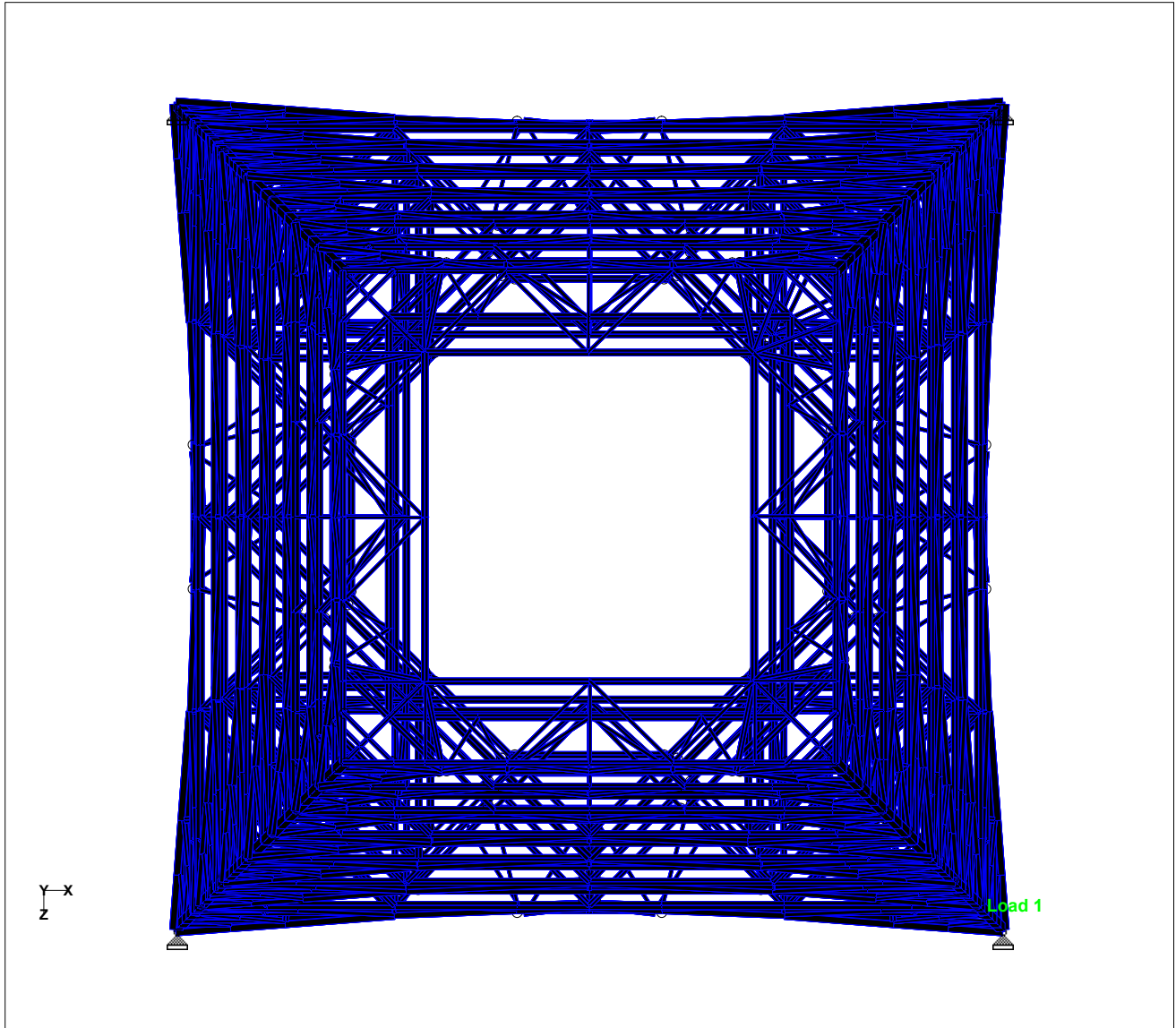
Date 29-Jul-20

Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std

Date/Time 29-Jul-2020 17:32



Structure 0 - 175ft (PLAN VIEW)



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

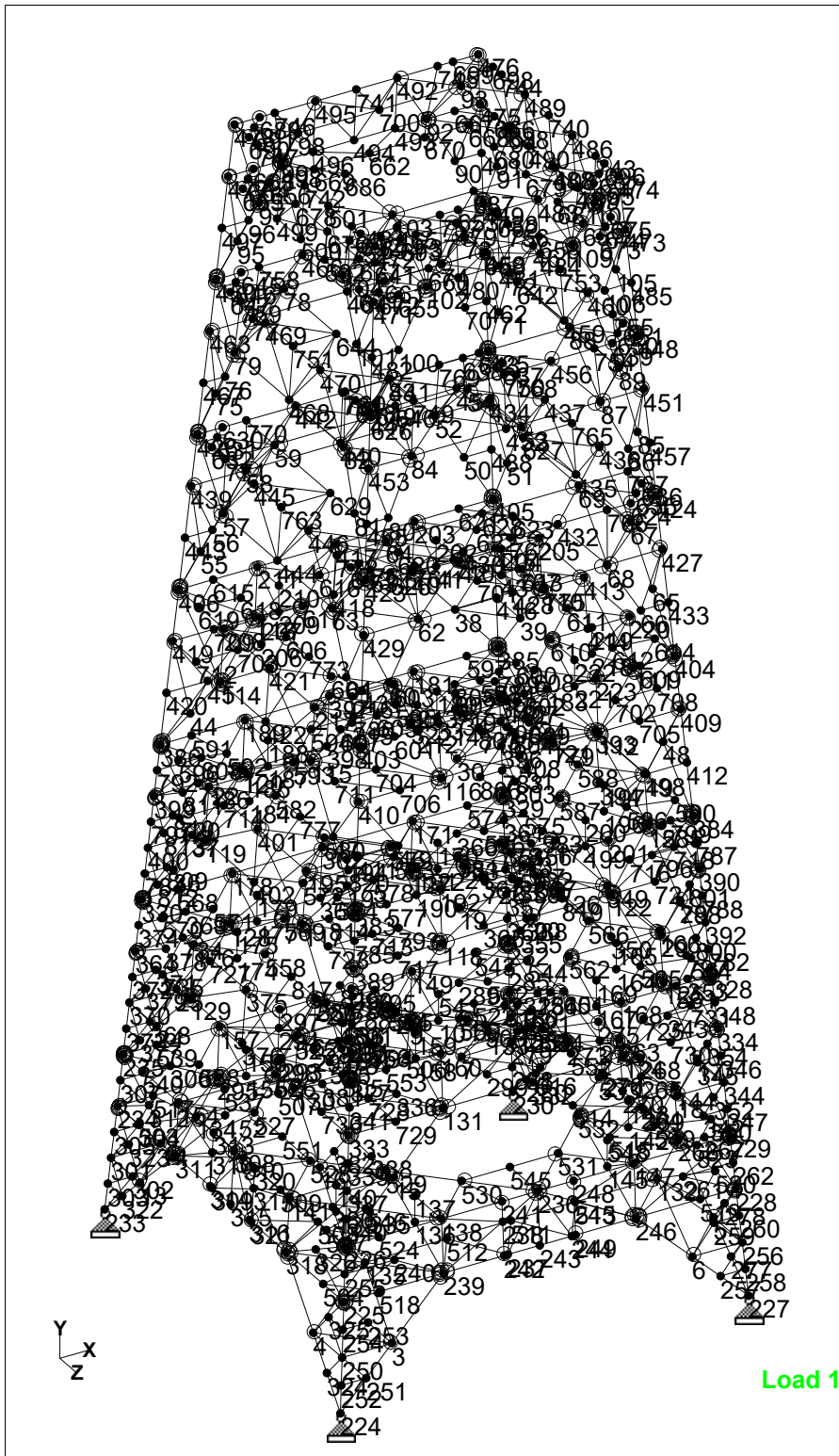
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By KM Date 29-Jul-20 Chd LKN

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Structure 0 - 175ft (Node Numbers)



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

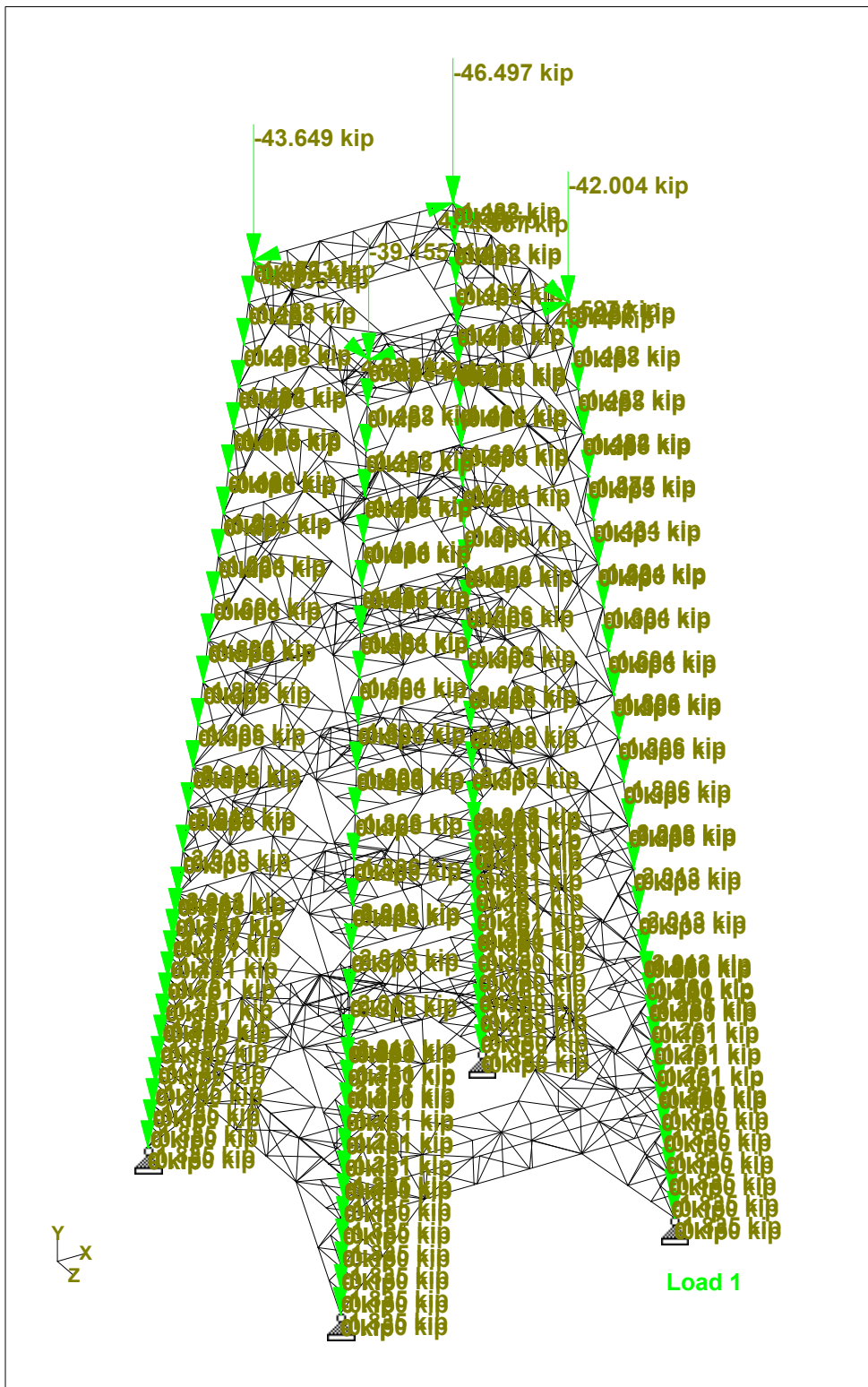
Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

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Whole Structure Loads 1.65878kip:1ft 1 DEAD ONLY





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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

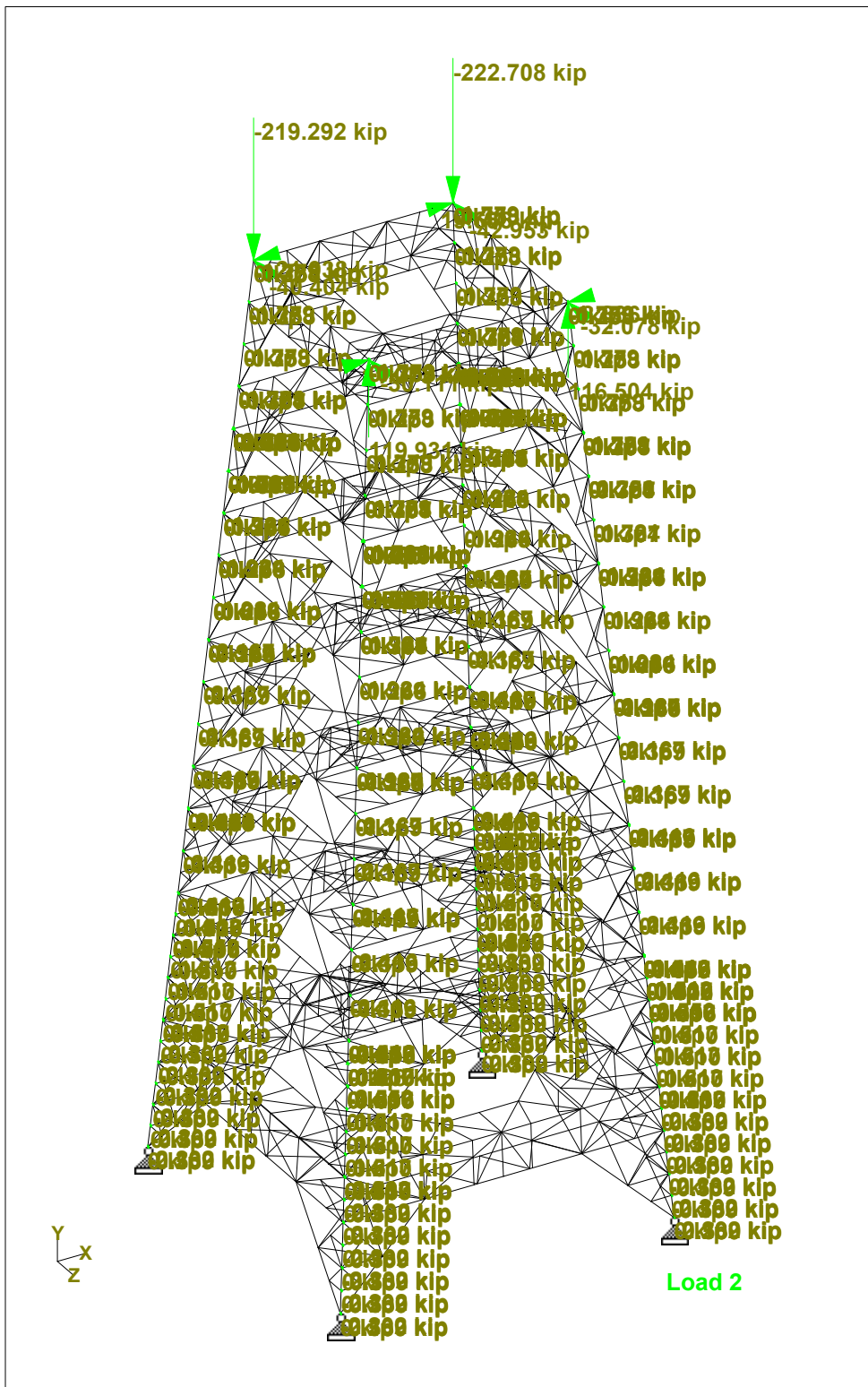
Date 29-Jul-20

Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

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Date/Time 29-Jul-2020 17:32



Whole Structure Loads 7.94515kip: 1ft 2 1.2 DEAD+1.6 WIND 0 DEG - NO ICE



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Part 0 TO 175FT OF TOWER

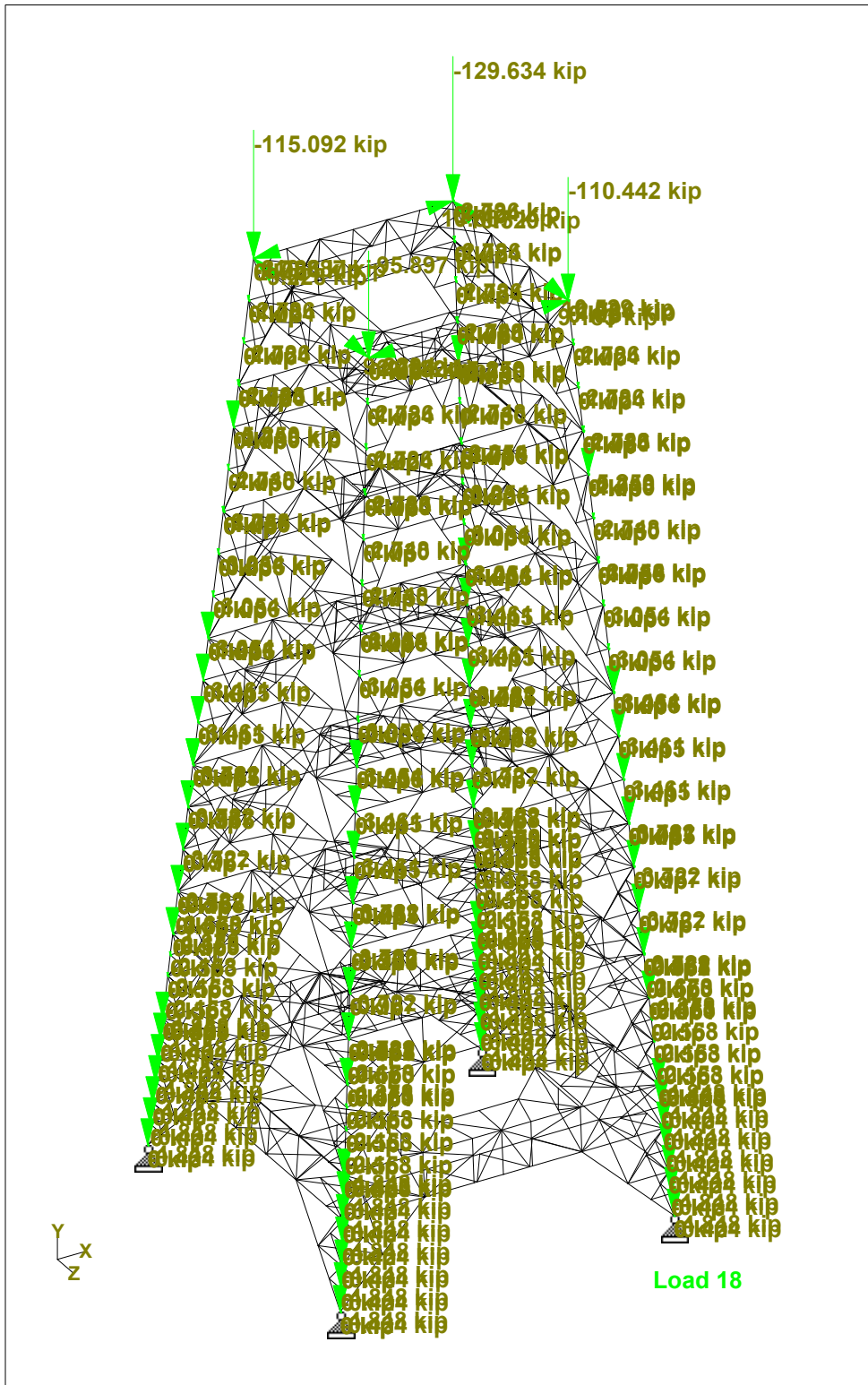
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

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Whole Structure Loads 4.62472kip:1ft 18 1.2 DEAD+1.0 ICE+1.0 TEMP



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**CT04761S-20V**

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Part 0 TO 175FT OF TOWER

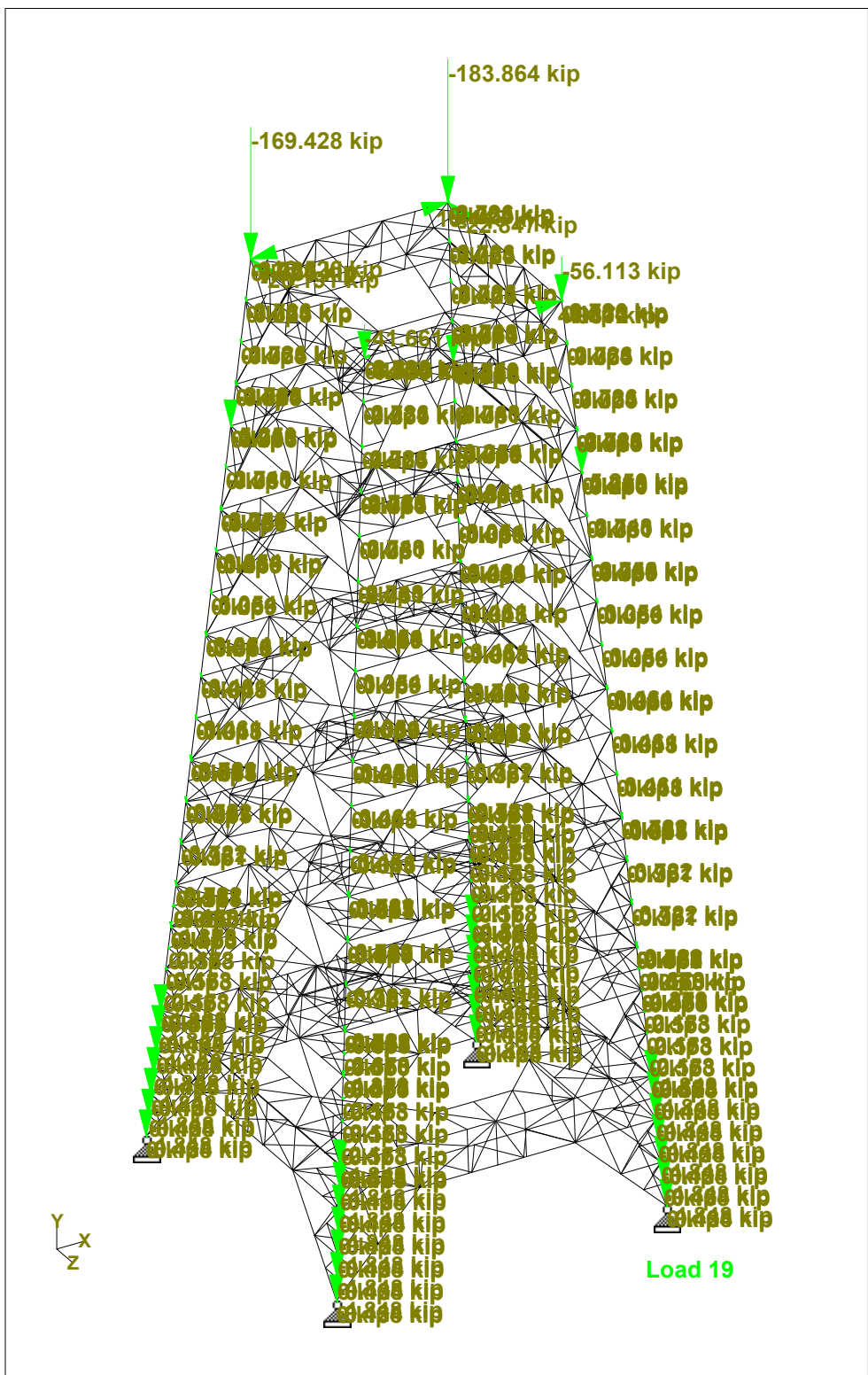
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std Date/Time 29-Jul-2020 17:32



Whole Structure Loads 6.55938kip:1ft 19 1.2 DEAD+1.0 WIND 0 DEG+1.0 ICE+1.0 TEMP



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Part 0 TO 175FT OF TOWER

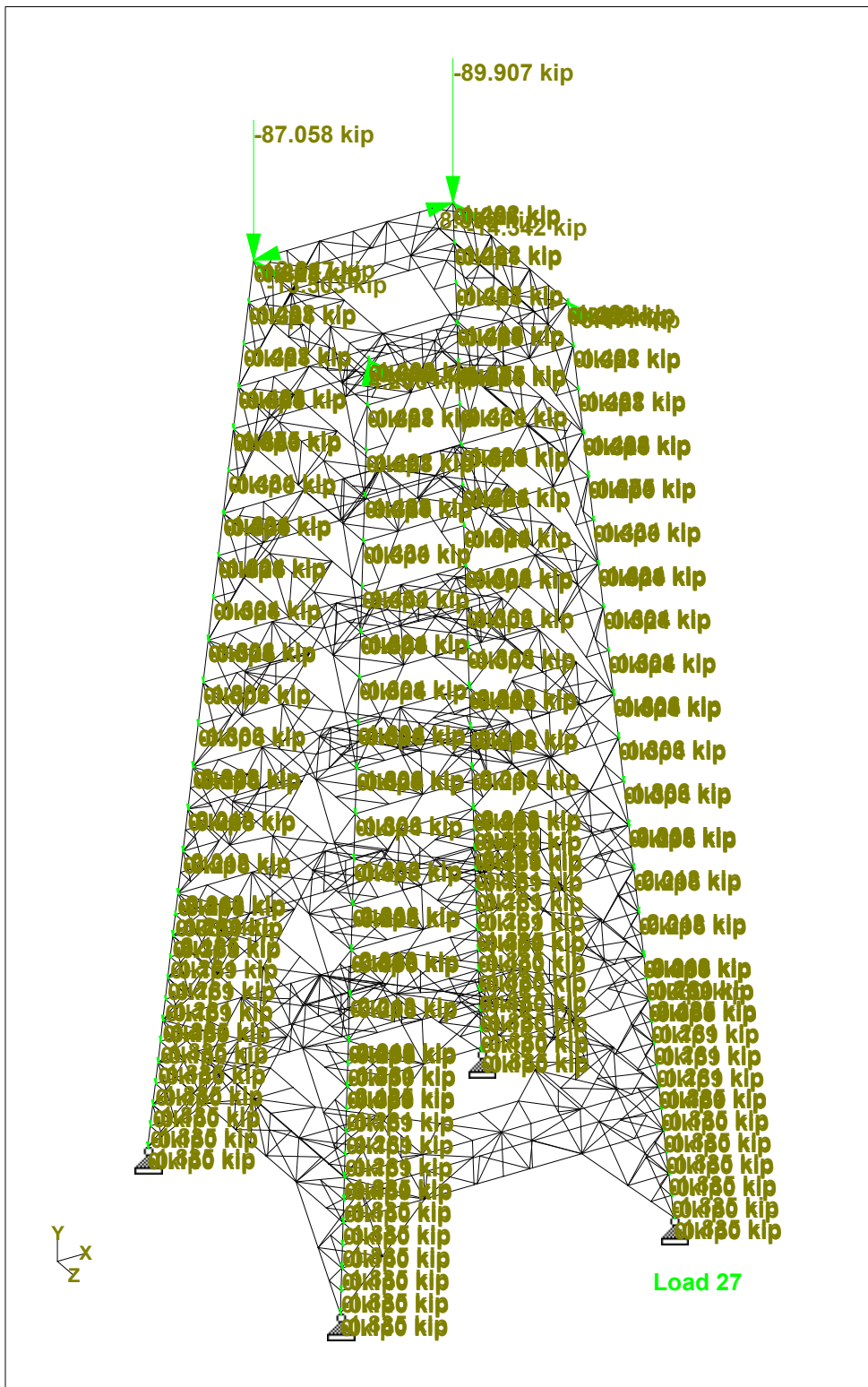
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 29-Jul-20 Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

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Whole Structure Loads 3.20745kip:1ft 27 DEAD+WIND 0 DEG - SERVICE



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**15**

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Job Title 351.7ft Self Supporting Tower

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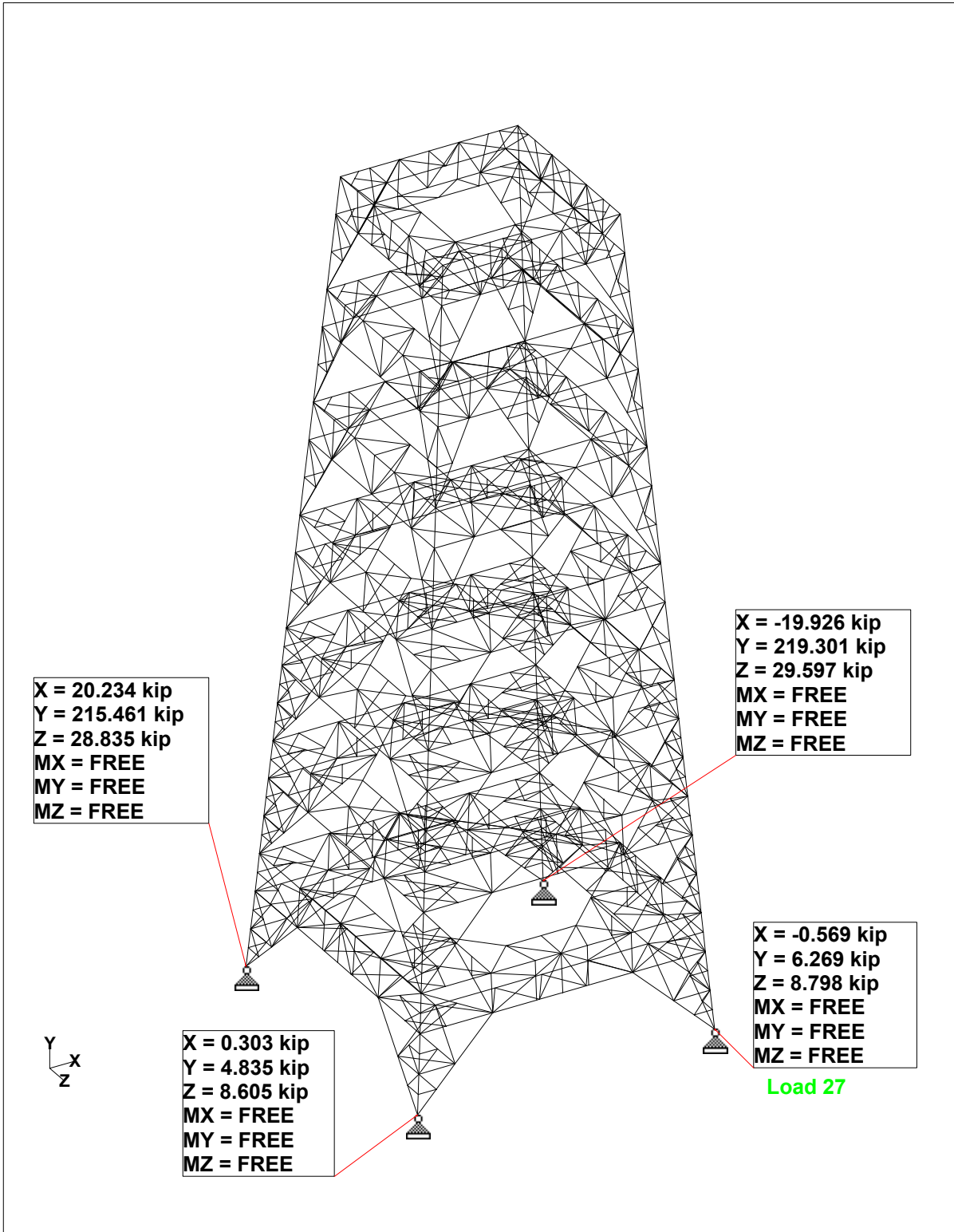
Date 29-Jul-20

Chd LKN

Client TRANSCEND WIRELESS / T-MOBILE

File CT04761S-20V1.std

Date/Time 29-Jul-2020 17:32



X = 20.234 kip  
Y = 215.461 kip  
Z = 28.835 kip  
MX = FREE  
MY = FREE  
MZ = FREE

X = -19.926 kip  
Y = 219.301 kip  
Z = 29.597 kip  
MX = FREE  
MY = FREE  
MZ = FREE

X = -0.569 kip  
Y = 6.269 kip  
Z = 8.798 kip  
MX = FREE  
MY = FREE  
MZ = FREE

X = 0.303 kip  
Y = 4.835 kip  
Z = 8.605 kip  
MX = FREE  
MY = FREE  
MZ = FREE

Load 27

Reactions

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**APPENDIX 2 – SOURCE / CHANGED CONDITION**

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<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
---	---

CT11011D\_Anchor\_6\_draft

Print Name: Standard  
PORs: Anchor\_Phase 3

### Section 1 - Site Information

**Site ID:** CT11011D  
**Status:** Draft  
**Version:** 6  
**Project Type:** Anchor  
**Approved:** Not Approved  
**Approved By:** Not Approved  
**Last Modified:** 7/15/2020 11:30:06 AM  
**Last Modified By:** Dominic.Kallas2@T-Mobile.com

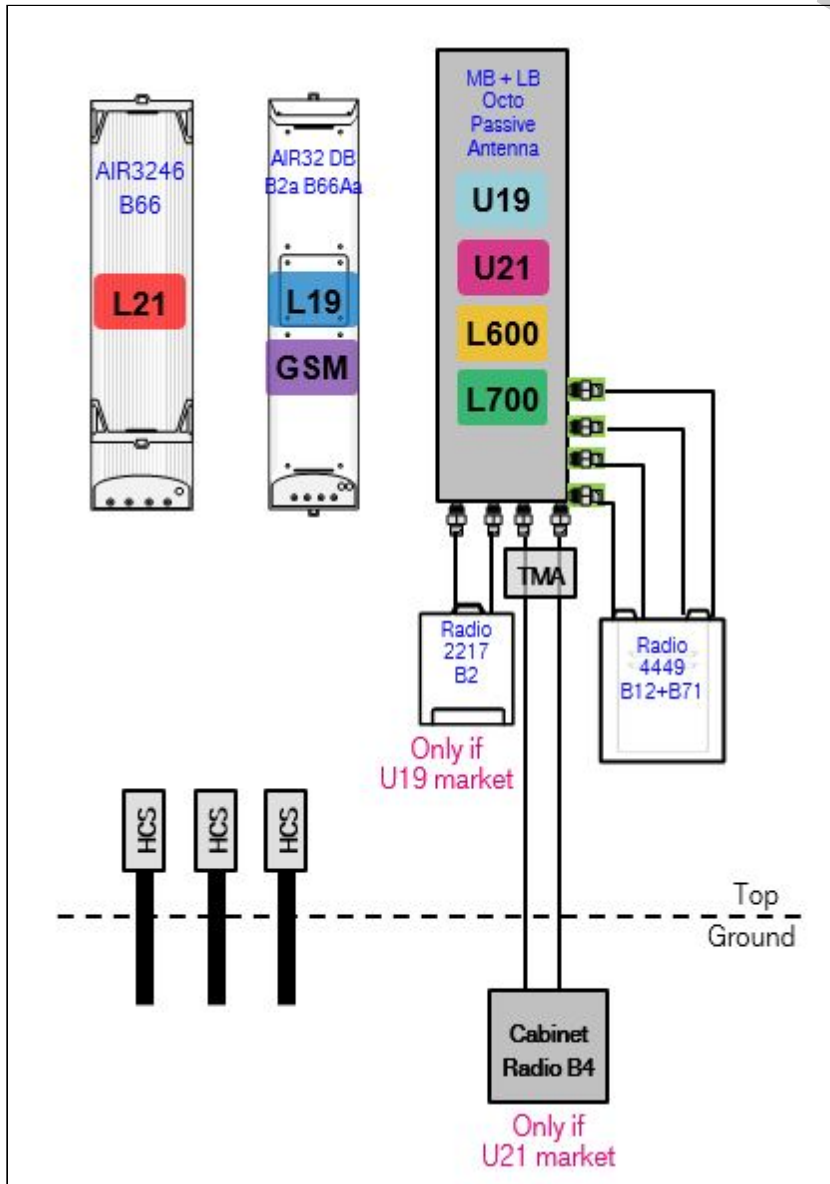
**Site Name:** Westport-SNET LL  
**Site Class:** Self Support Tower  
**Site Type:** Structure Non Building  
**Plan Year:** 2020  
**Market:** CONNECTICUT CT  
**Vendor:** Ericsson  
**Landlord:** <undefined>

**Latitude:** 41.12851800  
**Longitude:** -73.38993200  
**Address:** 10 Willard Road (SNET LL)  
**City, State:** Norwalk(Westport), CT  
**Region:** NORTHEAST

<b>RAN Template:</b> 67D5A993M Outdoor		<b>AL Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)		
<b>Sector Count:</b> 3	<b>Antenna Count:</b> 9	<b>Coax Line Count:</b> 6	<b>TMA Count:</b> 3	<b>RRU Count:</b> 6

### Section 2 - Existing Template Images

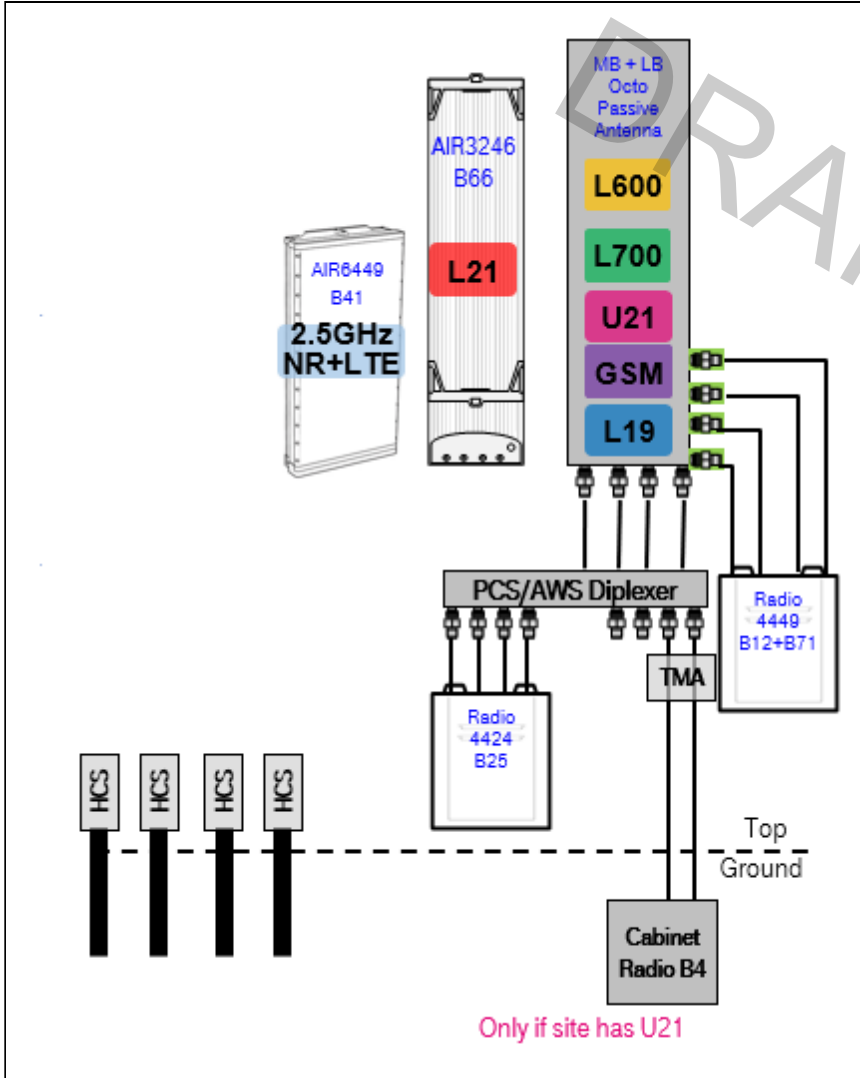
67D92M\_2xAIR+1OP.JPG



Notes:

Section 3 - Proposed Template Images

67D5993M\_2xAIR+1OP (Except NY - U21 Market).PNG



Notes:



Section 4 - Siteplan Images

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

DRAFT

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
---	---

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 67D92M Outdoor

Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment (Ericsson)
Baseband	DUW30 DUW30 U2100 DUG20 G1900 BB 5216 L700 L600 L1900 BB 6630 L2100 BB 6630 N600	
Hybrid Cable System		Ericsson 6x12 HCS 4AWG 100m (x 3)
Multiplexer	XMU L700 L600 L1900	
Radio	RU22 (x 6) U2100	

Proposed RAN Equipment

Template: 67D5A993M Outdoor

Enclosure	1	2	3	4
Enclosure Type	RBS 6131	Ancillary Equipment (Ericsson)	Enclosure 6160	B160
Baseband	DUW30 DUW30 U2100 DUG20 G1900 BB 6630 L1900 BB 6630 L2100 BB 6630 L700 L600 N600		BB 6630 L2500 BB 6648 N2500	
Hybrid Cable System		Ericsson 6x12 HCS 4AWG 100m (x 3)	Ericsson 6x12 HCS *Select AWG & Length* (x 3)	
Radio	RU22 (x 6) U2100			

RAN Scope of Work:

Replace BB5216 with (1) BB6630 for L1900 (both Carriers), L700, and L600 in existing RBS6131 cabinet, if still present.

Remove XMU from existing RBS6131 cabinet, if present.

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: (6) Coaxial Lines; (3) 6X12 & (3) 3X6 HCS

Remove all (3) 3X6 HCS.

Add (3) 6X12 HCS. There will be a total of (6) 6X12 HCS at the site ([2] 6X12 HCS per sector). DC and Fiber to be reallocated among A&L equipment. Length of new HCS to be determined.

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
---	---

Section 6 - A&L Equipment

**Existing Template:** 67D92M\_2xAIR+1OP  
**Proposed Template:** 67D5993M\_2xAIR+1OP (Except NY - U21 Market)

DRAFT

**Sector 1 (Existing) view from behind**

<b>Coverage Type</b>	A - Outdoor Macro											
<b>Antenna</b>	<b>1</b>				<b>2</b>				<b>3</b>			
<b>Antenna Model</b>	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)			
<b>Azimuth</b>	0				0				0			
<b>M. Tilt</b>	0				0				0			
<b>Height</b>	262				262				262			
<b>Ports</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>	<b>P11</b>	<b>P12</b>
<b>Active Tech.</b>			L1900 G1900	L1900 G1900	L700 L600 N600	L700 L600 N600		U2100	L2100	L2100	L2100	L2100
<b>Dark Tech.</b>												
<b>Restricted Tech.</b>												
<b>Decomm. Tech.</b>												
<b>E. Tilt</b>												
<b>Cables</b>					Coax Jumper (x2)	Coax Jumper (x2)		Generic Feeder Coax (x2) Coax Jumper (x2)				
<b>TMA's</b>								Generic Twin Style 1B - AWS (Antenna)				
<b>Diplexers / Combiners</b>												
<b>Radio</b>						Radio 4449 B71+ B85 (Antenna)						
<b>Sector Equipment</b>												

**Unconnected Equipment:**

**Scope of Work:**

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
---	---

**Sector 1 (Proposed) view from behind**

<b>Coverage Type</b>	A - Outdoor Macro									
<b>Antenna</b>	1		2				3			4
<b>Antenna Model</b>	Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)			Empty Antenna Mount (Empty mount)
<b>Azimuth</b>	0		0				0			
<b>M. Tilt</b>	0		0				0			
<b>Height</b>	262		262				262			
<b>Ports</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>
<b>Active Tech.</b>	L2500 N2500	L2500 N2500	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 U2100	L2100	L2100	L2100	L2100
<b>Dark Tech.</b>										
<b>Restricted Tech.</b>										
<b>Decomm. Tech.</b>										
<b>E. Tilt</b>										
<b>Cables</b>			Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Generic Feeder Coax (x2)				
<b>TMA's</b>						Generic Twin Style 1B - AWS (Antenna)				
<b>Diplexers / Combiners</b>					Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)	SHARED Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)				
<b>Radio</b>			Radio 4449 B71 +B85 (Antenna)	SHARED Radio 4449 B71 +B85 (Antenna)	Radio 4424 B25 (Antenna)	SHARED Radio 4424 B25 (Antenna)				
<b>Sector Equipment</b>										

Unconnected Equipment:

Scope of Work:

Remove AIR32 B66A/B2A 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 4424 B25 for L1900 (Both Carriers) and GSM to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect coaxial lines and AWS TMA for U2100 in Position 2 to two AWS input ports of the diplexer.

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

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.

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
---	---

Sector 2 (Existing) view from behind												
Coverage Type	A - Outdoor Macro											
Antenna	1			2				3			4	
Antenna Model	Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)			RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			Empty Antenna Mount (Empty mount)	
Azimuth	120			120				120				
M. Tilt	0			0				0				
Height	262			262				262				
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Active Tech.	L2100	L2100	L2100	L2100	L700 L600 N600	L700 L600 N600		U2100			L1900 G1900	L1900 G1900
Dark Tech.												
Restricted Tech.												
Decomm. Tech.												
E. Tilt												
Cables					Coax Jumper (x2)	Coax Jumper (x2)		Generic Feeder Coax (x2) Coax Jumper (x2)				
TMA's								Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners												
Radio						Radio 4449 B71+ B85 (At Antenna)						
Sector Equipment												
<b>Unconnected Equipment:</b>												
<b>Scope of Work:</b>												



<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
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**Sector 2 (Proposed) view from behind**

<b>Coverage Type</b>	A - Outdoor Macro										
<b>Antenna</b>	<b>1</b>				<b>2</b>				<b>3</b>		<b>4</b>
<b>Antenna Model</b>	Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		Empty Antenna Mount (Empty mount)
<b>Azimuth</b>	120				120				120		
<b>M. Tilt</b>	0				0				0		
<b>Height</b>	262				262				262		
<b>Ports</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>	
<b>Active Tech.</b>	L2100	L2100	L2100	L2100	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 U2100	L2500 N2500	L2500 N2500	
<b>Dark Tech.</b>											
<b>Restricted Tech.</b>											
<b>Decomm. Tech.</b>											
<b>E. Tilt</b>											
<b>Cables</b>					Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Generic Feeder Coax (x2)			
<b>TMA's</b>								Generic Twin Style 1B - AWS (Antenna)			
<b>Diplexers / Combiners</b>							Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)	SHARED Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)			
<b>Radio</b>					Radio 4449 B71 +B85 (Antenna)	SHARED Radio 4449 B71 +B85 (Antenna)	Radio 4424 B25 (Antenna)	SHARED Radio 4424 B25 (Antenna)			
<b>Sector Equipment</b>											

Unconnected Equipment:

Scope of Work:

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 4424 B25 for L1900 (Both Carriers) and GSM to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect coaxial lines and AWS TMA for U2100 in Position 2 to two AWS input ports of the diplexer.

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

Remove AIR32 B66A/B2A from Position 3.

Install AIR6449 B41 for L2500 and N2500 in Position 3.

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.

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
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Sector 3 (Existing) view from behind												
Coverage Type	A - Outdoor Macro											
Antenna	1			2				3			4	
Antenna Model	Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)			RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			Empty Antenna Mount (Empty mount)	
Azimuth	240			240				240				
M. Tilt	0			0				0				
Height	262			262				262				
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
Active Tech.	L2100	L2100	L2100	L2100	L700 L600 N600	L700 L600 N600		U2100			L1900 G1900	L1900 G1900
Dark Tech.												
Restricted Tech.												
Decomm. Tech.												
E. Tilt												
Cables					Coax Jumper (x2)	Coax Jumper (x2)		Generic Feeder Coax (x2) Coax Jumper (x2)				
TMA's								Generic Twin Style 1B - AWS (AtAntenna)				
Diplexers / Combiners												
Radio						Radio 4449 B71+ B85 (AtAntenna)						
Sector Equipment												
<b>Unconnected Equipment:</b>												
<b>Scope of Work:</b>												

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
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**Sector 3 (Proposed) view from behind**

<b>Coverage Type</b>	A - Outdoor Macro										
<b>Antenna</b>	1				2				3		4
<b>Antenna Model</b>	Ericsson - AIR3246 B66 (Active Antenna - Massive MIMO)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)		Empty Antenna Mount (Empty mount)
<b>Azimuth</b>	240				240				240		
<b>M. Tilt</b>	0				0				0		
<b>Height</b>	262				262				262		
<b>Ports</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>	<b>P8</b>	<b>P9</b>	<b>P10</b>	
<b>Active Tech.</b>	L2100	L2100	L2100	L2100	L700 L600 N600	L700 L600 N600	L1900 G1900	L1900 U2100	L2500 N2500	L2500 N2500	
<b>Dark Tech.</b>											
<b>Restricted Tech.</b>											
<b>Decomm. Tech.</b>											
<b>E. Tilt</b>											
<b>Cables</b>					Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2)	Coax Jumper (x2) Generic Feeder Coax (x2)			
<b>TMA's</b>								Generic Twin Style 1B - AWS (Antenna)			
<b>Diplexers / Combiners</b>							Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)	SHARED Commscope - SDX 1926 Q-43 (E14 F05 P86) (Antenna)			
<b>Radio</b>					Radio 4449 B71 +B85 (Antenna)	SHARED Radio 4449 B71 +B85 (Antenna)	Radio 4424 B25 (Antenna)	SHARED Radio 4424 B25 (Antenna)			
<b>Sector Equipment</b>											

Unconnected Equipment:

Scope of Work:

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 4424 B25 for L1900 (Both Carriers) and GSM to Position 2 near antenna, and connect its ports to the four PCS input ports of the diplexer.

Connect coaxial lines and AWS TMA for U2100 in Position 2 to two AWS input ports of the diplexer.

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

Remove AIR32 B66A/B2A from Position 3.

Install AIR6449 B41 for L2500 and N2500 in Position 3.

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.

<b>RAN Template:</b> 67D5A993M Outdoor	<b>A&amp;L Template:</b> 67D5993M_2xAIR+1OP (Except NY - U21 Market)
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**Section 7 - Power Systems Equipment**

**Existing Power Systems Equipment**

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**Proposed Power Systems Equipment**



## **Structural Analysis Report**

*Antenna Mount Analysis*

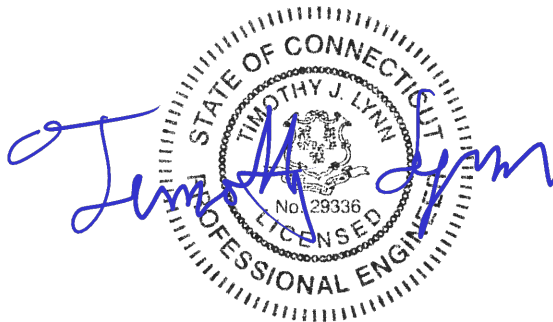
*T-Mobile Site #: CT11011D*

*10 Willard Road  
Norwalk, CT 06851*

*Centek Project No. 20074.64*

*Date: July 28, 2020*

*Max Stress Ratio = 70.5%*



**Prepared for:**

**T-Mobile USA  
35 Griffin Road  
Bloomfield, CT 06002**

*CENTEK Engineering, Inc.*  
*Structural Analysis – Mount Analysis*  
*T-Mobile Site Ref. ~ CT11011D*  
*Norwalk, CT*  
*July 28, 2020*

## **Table of Contents**

### **SECTION 1 – REPORT**

- ANTENNA AND APPURTENANCE SUMMARY
- STRUCTURE LOADING
- CONCLUSION

### **SECTION 2 – CALCULATIONS**

- WIND LOAD ON APPURTENANCES
- RISA3D OUTPUT REPORT

### **SECTION 3 – REFERENCE MATERIALS (NOT INCLUDED WITHIN REPORT)**

- RF DATA SHEET, DATED 7/15/2020

July 28, 2020

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

Re: *Structural Letter ~ Antenna Mount  
T-Mobile – Site Ref: CT11011D  
10 Willard Road  
Norwalk, CT 06851*

*Centek Project No. 20074.64*

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 three (3) T frame sector mounts with stiff arms to support the proposed/existing 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:

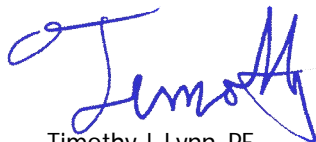
- T-Mobile:  
T-Frames: Three (3) Ericsson AIR3246 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, three (3) Ericsson AIR6449 panel antennas, three (3) KRY112 TMAs, three (3) Ericsson 4449 remote radio units, three (3) Ericsson 4424 remote radio units and three (3) Commscope SDX1926Q-43 diplexers mounted on three (3) T-Frames with a RAD center elevation of 262-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 Norwalk as required in Appendix N of the 2018 Connecticut State Building Code.

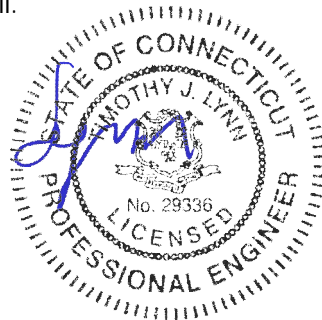
A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:



Timothy J. Lynn, PE  
Structural Engineer



**CEN TEK** Engineering, Inc.  
Structural Analysis – Mount Analysis  
T-Mobile Site Ref. ~ CT11011D  
Norwalk, CT  
July 28, 2020

## **Section 2 - Calculations**

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

**Wind Speeds**

Basic Wind Speed  $V := 93$  mph (User Input - 2016 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 := Lattice (User Input)  
 Structure Category = SC := II (User Input)  
 Exposure Category = Exp := C (User Input)  
 Structure Height = h := 350 ft (User Input)  
 Height to Center of Antennas =  $z_{Ant} := 262$  ft (User Input)  
 Radial Ice Thickness =  $t_i := 0.75$  in (User Input per Annex B of TIA-222-G)  
 Radial Ice Density =  $\rho_d := 56.00$  pcf (User Input)  
 Topographic Factor =  $K_{zt} := 1.0$  (User Input)  
 $K_a := 1.0$  (User Input)  
 Gust Response Factor =  $G_H = 0.85$  (User Input)

**Output**

Wind Direction Probability Factor =  $K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.85$  (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)

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

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

$$K_{iz} := \left( \frac{z_{Ant}}{33} \right)^{0.1} = 1.23$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.845$$

Velocity Pressure Coefficient Antennas =

$$K_{z_{Ant}} := 2.01 \left( \left( \frac{z_{Ant}}{z_g} \right) \right)^{\frac{2}{\alpha}} = 1.55$$

Velocity Pressure w/o Ice Antennas =

$$q_{z_{Ant}} := 0.00256 \cdot K_d \cdot K_{z_{Ant}} \cdot V^2 \cdot I_{Wind} = 29.174$$

Velocity Pressure with Ice Antennas =

$$q_{z_{ice.Ant}} := 0.00256 \cdot K_d \cdot K_{z_{Ant}} \cdot V_i^2 \cdot I_{Wind} = 8.433$$

**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 =  $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 140$  lbs

Surface Area for One Antenna =  $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$  sf

Total Antenna Wind Force =  $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 57$  lbs

**Wind Load (with ice)**

Surface Area for One Antenna w/ Ice =  $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.2$  sf

Total Antenna Wind Force w/ Ice =  $F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 53$  lbs

Surface Area for One Antenna w/ Ice =  $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.1$  sf

Total Antenna Wind Force w/ Ice =  $F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 26$  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 =  $V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz})(T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5040$  cu in

Weight of Ice on Each Antenna =  $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 163$  lbs

Weight of Ice on All Antennas =  $W_{ICEant} \cdot N_{ant} = 163$  lbs

**Development of Wind & Ice Load on Antennas**

**Antenna Data:**

Antenna Model =	Ericsson AIR3246	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 58.1$	in (User Input)
Antenna Width =	$W_{ant} := 15.7$	in (User Input)
Antenna Thickness =	$T_{ant} := 9.4$	in (User Input)
Antenna Weight =	$WT_{ant} := 180$	lbs (User Input)
Number of Antennas =	$N_{ant} := 1$	(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.7$	
Antenna Force Coefficient =	$Ca_{ant} = 1.25$	

**Wind Load (without ice)**

Surface Area for One Antenna =  $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 6.3$  sf

Total Antenna Wind Force =  $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 197$  lbs

Surface Area for One Antenna =  $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.8$  sf

Total Antenna Wind Force =  $F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 118$  lbs

**Wind Load (with ice)**

Surface Area for One Antenna w/ Ice =  $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 8.3$  sf

Total Antenna Wind Force w/ Ice =  $F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 75$  lbs

Surface Area for One Antenna w/ Ice =  $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5.6$  sf

Total Antenna Wind Force w/ Ice =  $F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 50$  lbs

**Gravity Load (without ice)**

Weight of All Antennas =  $WT_{ant} \cdot N_{ant} = 180$  lbs

**Gravity Loads (ice only)**

Volume of Each Antenna =  $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8574$  cu in

Volume of Ice on Each Antenna =  $V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 7110$  cu in

Weight of Ice on Each Antenna =  $W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 230$  lbs

Weight of Ice on All Antennas =  $W_{ICEant} \cdot N_{ant} = 230$  lbs

**Development of Wind & Ice Load on Antennas**

**Antenna Data:**

Antenna Model =	RFSAPXVAARR24-43	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 95.9$	in (User Input)
Antenna Width =	$W_{ant} := 24$	in (User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in (User Input)
Antenna Weight =	$WT_{ant} := 153$	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 =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 502$	lbs

Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 182$	lbs

**Wind Load (with ice)**

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19.2$	sf
Total Antenna Wind Force w/ Ice =	$F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 174$	lbs

Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.6$	sf
Total Antenna Wind Force w/ Ice =	$F_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 78$	lbs

**Gravity Load (without ice)**

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs
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**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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 458$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 458$	lbs



**Development of Wind & Ice Load on TMA's**

**TMA Data:**

TMA Model =	Ericsson KRY112 TMA
TMA Shape =	Flat (User Input)
TMA Height =	$L_{TMA} := 7.7$ in (User Input)
TMA Width =	$W_{TMA} := 7.5$ in (User Input)
TMA Thickness =	$T_{TMA} := 3.4$ in (User Input)
TMA Weight =	$W_{TMA} := 11$ lbs (User Input)
Number of TMA's =	$N_{TMA} := 1$ (User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$
TMA Force Coefficient =	$Ca_{TMA} = 1.2$

**Wind Load (without ice)**

Surface Area for One TMA =	$SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 12$	lbs

Surface Area for One TMA =	$SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$	sf
Total TMA Wind Force =	$F_{TMA} := qz_{Ant} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 5$	lbs

**Wind Load (with ice)**

Surface Area for One TMA w/ Ice =	$SA_{ICETMAF} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 0.9$	sf
Total TMA Wind Force w/ Ice =	$F_{i_{TMA}} := qz_{ice} \cdot Ant \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 8$	lbs

Surface Area for One TMA w/ Ice =	$SA_{ICETMAS} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz})}{144} = 0.6$	sf
Total TMA Wind Force w/ Ice =	$F_{i_{TMA}} := qz_{ice} \cdot Ant \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 5$	lbs

**Gravity Load (without ice)**

Weight of All TMA's =	$W_{TMA} \cdot N_{TMA} = 11$	lbs
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**Gravity Loads (ice only)**

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$	cu in
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 707$	cu in
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot \rho_d = 23$	lbs
Weight of Ice on All TMA's =	$W_{ICETMA} \cdot N_{TMA} = 23$	lbs

**Development of Wind & Ice Load on RRUS's**

**RRUS Data:**

RRUS Model =	Ericsson 4449
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 =	$W_{T_{RRUS}} := 74$ lbs (User Input)
Number of RRUSs =	$N_{RRUS} := 1$ (User Input)
RRUS Aspect Ratio =	$A_{r_{RRUS}} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$
RRUS Force Coefficient =	$C_{a_{RRUS}} = 1.2$

**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 =  $F_{RRUS} := q_{Z_{Ant}} \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{RRUSF} = 41$  lbs

Surface Area for One RRUS =  $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$  sf

Total RRUS Wind Force =  $F_{RRUS} := q_{Z_{Ant}} \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{RRUSS} = 32$  lbs

**Wind Load (with ice)**

Surface Area for One RRUS w/ Ice =  $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.2$  sf

Total RRUS Wind Force w/ Ice =  $F_{i_{RRUS}} := q_{Z_{ice}} \cdot Ant \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{ICERRUSF} = 19$  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 =  $F_{i_{RRUS}} := q_{Z_{ice}} \cdot Ant \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{ICERRUSS} = 16$  lbs

**Gravity Load (without ice)**

Weight of All RRUSs =  $W_{T_{RRUS}} \cdot N_{RRUS} = 74$  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 =  $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2370$

Weight of Ice on Each RRUS =  $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot \rho_d = 77$  lbs

Weight of Ice on All RRUSs =  $W_{ICERRUS} \cdot N_{RRUS} = 77$  lbs

**Development of Wind & Ice Load on RRUS**

**RRUS Data:**

RRUS Model =	Ericsson 4424
RRUS Shape =	Flat (User Input)
RRUS Height =	$L_{RRUS} := 16.5$ in (User Input)
RRUS Width =	$W_{RRUS} := 13.5$ in (User Input)
RRUS Thickness =	$T_{RRUS} := 9.6$ in (User Input)
RRUS Weight =	$W_{T_{RRUS}} := 88$ lbs (User Input)
Number of RRUSs =	$N_{RRUS} := 1$ (User Input)
RRUS Aspect Ratio =	$A_{r_{RRUS}} := \frac{L_{RRUS}}{W_{RRUS}} = 1.2$
RRUS Force Coefficient =	$C_{a_{RRUS}} = 1.2$

**Wind Load (without ice)**

Surface Area for One RRUS =  $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.5$  sf

Total RRUS Wind Force =  $F_{RRUS} := q_{Z_{Ant}} \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{RRUSF} = 46$  lbs

Surface Area for One RRUS =  $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$  sf

Total RRUS Wind Force =  $F_{RRUS} := q_{Z_{Ant}} \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{RRUSS} = 33$  lbs

**Wind Load (with ice)**

Surface Area for One RRUS w/ Ice =  $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.4$  sf

Total RRUS Wind Force w/ Ice =  $F_{i_{RRUS}} := q_{Z_{ice}} \cdot Ant \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{ICERRUSF} = 21$  lbs

Surface Area for One RRUS w/ Ice =  $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.9$  sf

Total RRUS Wind Force w/ Ice =  $F_{i_{RRUS}} := q_{Z_{ice}} \cdot Ant \cdot G_H \cdot C_{a_{RRUS}} \cdot K_a \cdot SA_{ICERRUSS} = 16$  lbs

**Gravity Load (without ice)**

Weight of All RRUSs =  $W_{T_{RRUS}} \cdot N_{RRUS} = 88$  lbs

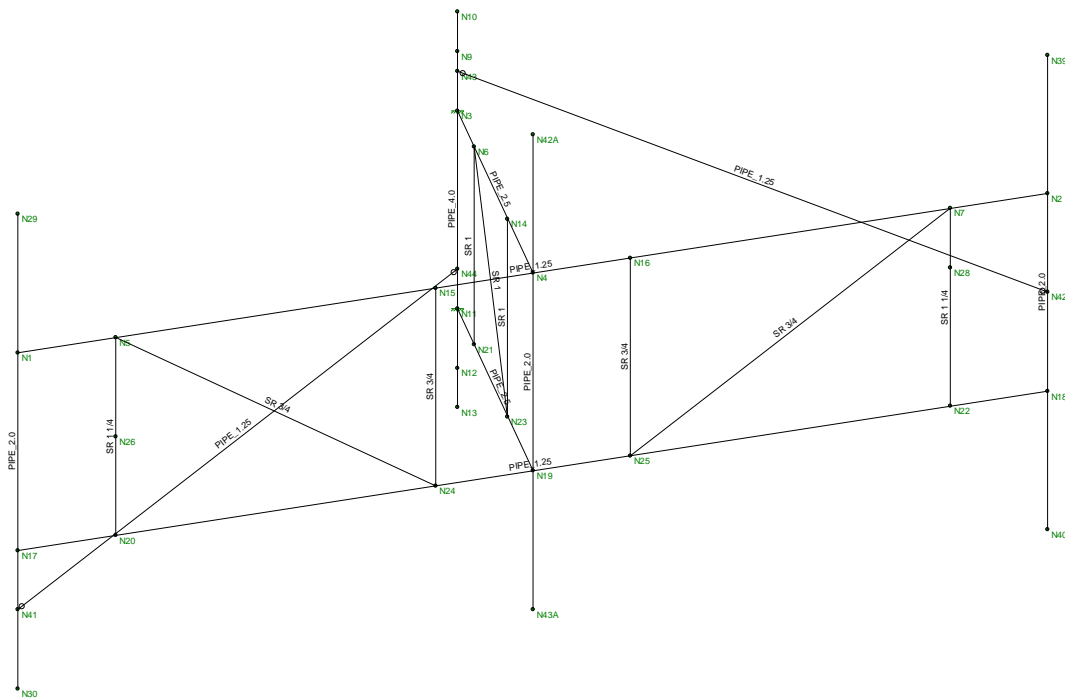
**Gravity Loads (ice only)**

Volume of Each RRUS =  $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2138$  cu in

Volume of Ice on Each RRUS =  $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2475$  cu in

Weight of Ice on Each RRUS =  $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 80$  lbs

Weight of Ice on All RRUSs =  $W_{ICERRUS} \cdot N_{RRUS} = 80$  lbs



Envelope Only Solution

Centek
TJL
20074.64

CT11011D - Mount  
Member Framing

July 28, 2020 at 2:47 PM
Mount Analysis.R3D

**(Global) Model Settings**

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	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	1
Cd X	1
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)	150.001
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	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

**Hot Rolled Steel Properties**

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

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...A [in2]	lyy [in4]	lzz [in4]	J [in4]	
1	Face Offset	Flat Bar 2x1/2	Beam	Wide Flange	A36 Gr.36	Typical	1	.021	.333	.07
2	Face Tube	HSS2.5X2.5X3	Beam	Tube	A500 Gr.46	Typical	1.54	1.35	1.35	2.25
3	Vert	PIPE_4.0	Column	Pipe	A53 Grade B	Typical	2.96	6.82	6.82	13.6
4	Outrigger	PIPE_2.5	Beam	Tube	A53 Grade B	Typical	1.61	1.45	1.45	2.89
5	Outrigger Brace	SR 1	Column	Pipe	A36 Gr.36	Typical	.785	.049	.049	.098
6	Horz	PIPE_1.25	Beam	Pipe	A53 Grade B	Typical	.625	.184	.184	.368
7	Horz Brace 1	SR 1 1/4	Column	Pipe	A36 Gr.36	Typical	1.227	.12	.12	.24
8	Horz Brace 2	SR 3/4	Column	Pipe	A36 Gr.36	Typical	.442	.016	.016	.031
9	Stiff Arm	PIPE_1.25	Beam	Pipe	A53 Grade B	Typical	.625	.184	.184	.368
10	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Grade 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	Vert	5			Lbyy				Lateral
2	M2	Stiff Arm	6.388			Lbyy				Lateral
3	M3	Stiff Arm	6.505			Lbyy				Lateral
4	M4	Outrigger Brace	2.5			Lbyy				Lateral
5	M5	Outrigger Brace	2.833			Lbyy				Lateral
6	M6	Outrigger Brace	2.5			Lbyy				Lateral
7	M7	Outrigger	3	Segment	Segment	Segment	Segment	Segm...		Lateral
8	M8	Outrigger	3	Segment	Segment	Segment	Segment	Segm...		Lateral
9	M9	Horz Brace 2	4.235	4	4	4	4	4		Lateral
10	M10	Horz Brace 2	2.5	4	4	4	4	4		Lateral
11	M11	Horz Brace 2	2.5	4	4	4	4	4		Lateral
12	M12	Horz Brace 2	4.235	4	4	4	4	4		Lateral
13	M13	Horz Brace 1	2.5			Lbyy				Lateral
14	M14	Horz Brace 1	2.5			Lbyy				Lateral
15	M15	Horz	11	Segment	Segment	Segment	Segment	Segm...		Lateral
16	M16	Horz	11	Segment	Segment	Segment	Segment	Segm...		Lateral
17	M18	Antenna Mast	6			Lbyy				Lateral
18	M19	Antenna Mast	6			Lbyy				Lateral
19	M20	Antenna Mast	6			Lbyy				Lateral

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N13	N10			Vert	Column	Pipe	A53 Gra...	Typical
2	M2	N41	N44			Stiff Arm	Beam	Pipe	A53 Gra...	Typical
3	M3	N42	N43			Stiff Arm	Beam	Pipe	A53 Gra...	Typical
4	M4	N21	N6			Outrigger Brace	Column	Pipe	A36 Gr.36	Typical
5	M5	N6	N23			Outrigger Brace	Column	Pipe	A36 Gr.36	Typical
6	M6	N23	N14			Outrigger Brace	Column	Pipe	A36 Gr.36	Typical
7	M7	N3	N4			Outrigger	Beam	Tube	A53 Gra...	Typical
8	M8	N11	N19			Outrigger	Beam	Tube	A53 Gra...	Typical
9	M9	N5	N24			Horz Brace 2	Column	Pipe	A36 Gr.36	Typical
10	M10	N24	N15			Horz Brace 2	Column	Pipe	A36 Gr.36	Typical
11	M11	N16	N25			Horz Brace 2	Column	Pipe	A36 Gr.36	Typical
12	M12	N25	N7			Horz Brace 2	Column	Pipe	A36 Gr.36	Typical
13	M13	N20	N5			Horz Brace 1	Column	Pipe	A36 Gr.36	Typical



**Member Primary Data (Continued)**

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
14	M14	N22	N7			Horz Brace 1	Column	Pipe	A36 Gr.36	Typical
15	M15	N1	N2			Horz	Beam	Pipe	A53 Gra...	Typical
16	M16	N17	N18			Horz	Beam	Pipe	A53 Gra...	Typical
17	M18	N30	N29			Antenna Mast	Column	Pipe	A53 Gra...	Typical
18	M19	N43A	N42A			Antenna Mast	Column	Pipe	A53 Gra...	Typical
19	M20	N40	N39			Antenna Mast	Column	Pipe	A53 Gra...	Typical

**Joint Coordinates and Temperatures**

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	1.552616	1.25	7.21549	0	
2	N2	7.052616	1.25	-2.310789	0	
3	N3	1.70454	1.25	0.95235	0	
4	N4	4.302616	1.25	2.45235	0	
5	N5	2.07345	1.25	6.31338	0	
6	N6	2.28189	1.25	1.285684	0	
7	N7	6.531783	1.25	-1.40868	0	
8	N9	1.70454	2	0.95235	0	
9	N10	1.70454	2.5	0.95235	0	
10	N11	1.70454	-1.25	0.95235	0	
11	N12	1.70454	-2	0.95235	0	
12	N13	1.70454	-2.5	0.95235	0	
13	N14	3.436591	1.25	1.95235	0	
14	N15	3.782616	1.25	3.353017	0	
15	N16	4.822616	1.25	1.551684	0	
16	N17	1.552616	-1.25	7.21549	0	
17	N18	7.052616	-1.25	-2.310789	0	
18	N19	4.302616	-1.25	2.45235	0	
19	N20	2.07345	-1.25	6.31338	0	
20	N21	2.28189	-1.25	1.285684	0	
21	N22	6.531783	-1.25	-1.40868	0	
22	N23	3.436591	-1.25	1.95235	0	
23	N24	3.782616	-1.25	3.353017	0	
24	N25	4.822616	-1.25	1.551684	0	
25	N26	2.07345	0	6.31338	0	
26	N28	6.531783	.5	-1.40868	0	
27	N29	1.552616	3	7.21549	0	
28	N30	1.552616	-3	7.21549	0	
29	N39	7.052616	3	-2.310789	0	
30	N40	7.052616	-3	-2.310789	0	
31	N41	1.552616	-2	7.21549	0	
32	N42	7.052616	0	-2.310789	0	
33	N43	1.70454	1.75	0.95235	0	
34	N44	1.70454	-.75	0.95235	0	
35	N42A	4.302616	3	2.45235	0	
36	N43A	4.302616	-3	2.45235	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	N11	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N43						
4	N44						

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.09	%15
2	M20	Y	-.09	%85
3	M19	Y	-.077	%15
4	M19	Y	-.077	%85
5	M19	Y	-.074	3.333
6	M18	Y	-.052	%15
7	M18	Y	-.052	%85
8	M19	Y	-.011	4.583
9	M19	Y	-.088	2

**Member Point Loads (BLC 3 : Ice Weight)**

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Y	-.115	%85
2	M20	Y	-.115	%15
3	M19	Y	-.229	%85
4	M19	Y	-.229	%15
5	M19	Y	-.077	3.333
6	M18	Y	-.082	%85
7	M18	Y	-.082	%15
8	M19	Y	-.023	4.583
9	M19	Y	-.08	2

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	-.038	%15
2	M20	X	-.038	%85
3	M19	X	-.087	%15
4	M19	X	-.087	%85
5	M18	X	-.027	%15
6	M18	X	-.027	%85

**Member Point Loads (BLC 5 : Wind X)**

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	X	-.099	%85
2	M20	X	-.099	%15
3	M19	X	-.251	%85
4	M19	X	-.251	%15
5	M18	X	-.07	%85
6	M18	X	-.07	%15

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	-.025	%15
2	M20	Z	-.025	%85
3	M19	Z	-.039	%15
4	M19	Z	-.039	%85
5	M19	Z	-.016	3.333
6	M18	Z	-.013	%15
7	M18	Z	-.013	%85
8	M19	Z	-.005	4.583
9	M19	Z	-.016	2

**Member Point Loads (BLC 7 : Wind Z)**

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M20	Z	-.059	%85
2	M20	Z	-.059	%15
3	M19	Z	-.091	%85
4	M19	Z	-.091	%15
5	M19	Z	-.032	3.333
6	M18	Z	-.029	%85
7	M18	Z	-.029	%15
8	M19	Z	-.005	4.583
9	M19	Z	-.033	2

**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	M2	X	.00096	.00096	0	0
2	M3	X	.00096	.00096	0	0
3	M9	X	.00096	.00096	0	0
4	M10	X	.00096	.00096	0	0
5	M11	X	.00096	.00096	0	0
6	M12	X	.00096	.00096	0	0
7	M13	X	.00096	.00096	0	0
8	M14	X	.00096	.00096	0	0
9	M15	X	.00096	.00096	0	0
10	M16	X	.00096	.00096	0	0
11	M18	X	.00096	.00096	0	0
12	M19	X	.00096	.00096	0	0
13	M20	X	.00096	.00096	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	M2	X	.003	.003	0	0
2	M3	X	.003	.003	0	0
3	M9	X	.003	.003	0	0
4	M10	X	.003	.003	0	0
5	M11	X	.003	.003	0	0
6	M12	X	.003	.003	0	0
7	M13	X	.003	.003	0	0
8	M14	X	.003	.003	0	0
9	M15	X	.003	.003	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,%]
10	M16	X	.003	.003	0	0
11	M18	X	.003	.003	0	0
12	M19	X	.003	.003	0	0
13	M20	X	.003	.003	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	M1	Z	-.00096	-.00096	0	0
2	M2	Z	-.00096	-.00096	0	0
3	M3	Z	-.00096	-.00096	0	0
4	M4	Z	-.00096	-.00096	0	0
5	M5	Z	-.00096	-.00096	0	0
6	M6	Z	-.00096	-.00096	0	0
7	M7	Z	-.00096	-.00096	0	0
8	M8	Z	-.00096	-.00096	0	0
9	M9	Z	-.00096	-.00096	0	0
10	M10	Z	-.00096	-.00096	0	0
11	M11	Z	-.00096	-.00096	0	0
12	M12	Z	-.00096	-.00096	0	0
13	M13	Z	-.00096	-.00096	0	0
14	M14	Z	-.00096	-.00096	0	0
15	M15	Z	-.00096	-.00096	0	0
16	M16	Z	-.00096	-.00096	0	0
17	M18	Z	-.00096	-.00096	0	0
18	M19	Z	-.00096	-.00096	0	0
19	M20	Z	-.00096	-.00096	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	M1	Z	-.003	-.003	0	0
2	M2	Z	-.003	-.003	0	0
3	M3	Z	-.003	-.003	0	0
4	M4	Z	-.003	-.003	0	0
5	M5	Z	-.003	-.003	0	0
6	M6	Z	-.003	-.003	0	0
7	M7	Z	-.003	-.003	0	0
8	M8	Z	-.003	-.003	0	0
9	M9	Z	-.003	-.003	0	0
10	M10	Z	-.003	-.003	0	0
11	M11	Z	-.003	-.003	0	0
12	M12	Z	-.003	-.003	0	0
13	M13	Z	-.003	-.003	0	0
14	M14	Z	-.003	-.003	0	0
15	M15	Z	-.003	-.003	0	0
16	M16	Z	-.003	-.003	0	0
17	M18	Z	-.003	-.003	0	0
18	M19	Z	-.003	-.003	0	0
19	M20	Z	-.003	-.003	0	0

### 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					9			
3	Ice Weight	None					9			
4	Wind w/ Ice X	None					6	13		
5	Wind X	None					6	13		
6	Wind w/ Ice Z	None					9	19		
7	Wind Z	None					9	19		

### Load Combinations

	Description	Solve	P...	S...	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..
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 (X-direc...	Yes	Y		1	1.2	2	1.2	7	1.6					
5	0.9D + 1.6W (X-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	N11	max	1.926	3	.789	3	1.015	4	.185	2	1.05	1	.449	3
2		min	.656	5	.328	5	.342	2	-.016	6	-1.132	5	.221	5
3	N3	max	-.151	2	1.315	6	.241	5	-.033	5	.065	2	.635	6
4		min	-1.815	6	.475	2	-.836	3	-.157	3	-1.95	4	.187	2
5	Totals:	max	.965	2	2.104	6	1.164	5						
6		min	0	4	.804	2	0	1						

### 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	.306	4	.211	1	-.064	6	-2.085e-03	6	1.542e-03	5	6.534e-03	2
2		min	-.518	2	.132	6	-.271	1	-7.353e-03	1	-1.029e-02	1	-2.11e-03	6
3	N2	max	-.063	2	-.241	5	-.007	2	-3.31e-03	5	8.34e-03	4	2.897e-05	2
4		min	-.378	4	-.331	3	-.542	4	-3.991e-03	1	3.827e-03	2	-2.279e-03	6
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	.139	4	-.016	5	.024	2	-1.625e-03	6	1.045e-02	4	-1.382e-03	2
8		min	-.014	2	-.04	3	-.24	4	-2.285e-03	4	-1.892e-03	2	-2.881e-03	6
9	N5	max	.294	4	.168	1	-.062	6	-1.727e-03	6	9.809e-04	5	4.843e-03	2
10		min	-.4	2	.106	6	-.202	1	-6.964e-03	1	-1.116e-02	1	-2.091e-03	6
11	N6	max	.011	4	-.002	5	0	2	-2.265e-04	3	4.816e-03	4	-5.043e-04	2
12		min	0	2	-.005	3	-.018	4	-3.961e-04	4	-2.548e-04	2	-8.415e-04	3
13	N7	max	-.024	2	-.192	5	.015	2	-3.372e-03	5	8.372e-03	4	-1.245e-03	2
14		min	-.288	4	-.263	3	-.49	4	-5.041e-03	1	3.17e-03	2	-2.523e-03	6
15	N9	max	0	6	0	2	0	2	1.701e-05	2	2.052e-06	4	3.529e-05	2
16		min	0	2	0	6	0	6	-2.302e-06	6	1.334e-06	3	6.509e-06	6
17	N10	max	0	6	0	2	0	2	1.701e-05	2	2.052e-06	4	3.529e-05	2
18		min	0	2	0	6	0	6	-2.32e-06	6	1.334e-06	3	6.509e-06	6

**Envelope Joint Displacements (Continued)**

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
19	N11	max	0	6	0	6	0	6	0	6	0	6	0	6
20		min	0	1	0	1	0	1	0	1	0	1	0	1
21	N12	max	0	6	0	5	0	3	1.473e-06	5	0	6	0	6
22		min	0	1	0	1	0	4	0	1	0	1	0	1
23	N13	max	0	6	0	5	0	3	1.574e-06	5	0	6	0	6
24		min	0	1	0	1	0	4	0	1	0	1	0	1
25	N14	max	.075	4	-.007	5	.009	2	-8.824e-04	3	1.012e-02	4	-1.408e-03	2
26		min	-.005	2	-.016	3	-.129	4	-1.375e-03	4	-1.038e-03	2	-2.248e-03	3
27	N15	max	.224	4	.013	2	0	2	-7.119e-04	6	5.672e-03	4	-1.692e-05	2
28		min	-.057	2	-.02	6	-.19	4	-3.097e-03	1	-5.863e-03	2	-2.061e-03	6
29	N16	max	.029	4	-.062	5	.034	2	-3.172e-03	5	9.829e-03	4	-2.026e-03	2
30		min	.005	2	-.103	3	-.303	4	-4.709e-03	1	-1.308e-03	2	-3.476e-03	3
31	N17	max	.362	5	.211	1	.008	6	-2.05e-03	6	2.332e-03	5	4.896e-03	2
32		min	-.353	1	.132	6	-.043	2	-7.918e-03	1	-8.678e-03	1	-2.057e-03	6
33	N18	max	-.12	2	-.241	5	.086	2	-2.514e-03	5	8.548e-03	4	-2.479e-03	5
34		min	-.433	4	-.331	3	-.453	4	-3.753e-03	1	3.997e-03	2	-4.444e-03	1
35	N19	max	.09	5	-.016	5	.121	1	-1.366e-03	6	7.794e-03	5	-1.761e-03	5
36		min	-.071	1	-.04	3	-.158	5	-2.565e-03	1	-4.882e-03	1	-3.243e-03	3
37	N20	max	.333	5	.167	1	.012	3	-1.745e-03	6	3.093e-03	5	4.288e-03	2
38		min	-.269	1	.106	6	-.018	5	-6.229e-03	1	-6.996e-03	1	-2.08e-03	6
39	N21	max	.006	5	-.001	5	.01	1	-3.112e-04	6	2.901e-03	5	-3.828e-04	5
40		min	-.006	1	-.003	3	-.011	5	-5.813e-04	1	-2.551e-03	1	-6.638e-04	3
41	N22	max	-.077	2	-.192	5	.111	2	-2.9e-03	2	8.964e-03	4	-2.18e-03	5
42		min	-.338	4	-.263	3	-.398	4	-3.846e-03	3	3.721e-03	2	-3.376e-03	1
43	N23	max	.046	5	-.005	5	.067	1	-7.347e-04	6	6.683e-03	5	-1.257e-03	5
44		min	-.04	1	-.013	3	-.081	5	-1.748e-03	1	-5.103e-03	1	-2.382e-03	3
45	N24	max	.166	5	.013	2	.096	1	-6.67e-04	6	6.282e-03	5	-7.739e-04	2
46		min	-.113	1	-.021	6	-.114	5	-2.377e-03	1	-3.364e-03	1	-2.197e-03	6
47	N25	max	-.001	5	-.062	5	.143	1	-3.305e-03	2	9.098e-03	4	-2.38e-03	5
48		min	-.034	1	-.104	3	-.21	5	-3.952e-03	3	-2.18e-03	2	-3.798e-03	3
49	N26	max	.311	5	.167	1	-.027	6	-2.61e-03	6	2.037e-03	5	4.692e-03	2
50		min	-.33	1	.106	6	-.095	1	-7.159e-03	1	-9.079e-03	1	-2.571e-03	6
51	N28	max	-.035	2	-.192	5	.051	2	-2.624e-03	5	8.55e-03	4	-1.16e-03	5
52		min	-.302	4	-.263	3	-.46	4	-3.732e-03	1	3.335e-03	2	-1.737e-03	3
53	N29	max	.272	4	.211	1	-.108	6	-2.143e-03	6	1.542e-03	5	6.891e-03	2
54		min	-.662	2	.132	6	-.425	1	-7.357e-03	1	-1.029e-02	1	-2.112e-03	6
55	N30	max	.402	5	.211	1	.135	1	-2.048e-03	6	2.342e-03	5	4.372e-03	2
56		min	-.268	1	.132	6	.051	6	-8.45e-03	1	-8.639e-03	1	-1.994e-03	6
57	N39	max	-.073	2	-.241	5	-.082	2	-3.547e-03	2	8.34e-03	4	5.488e-04	2
58		min	-.352	4	-.331	3	-.627	4	-4.124e-03	4	3.827e-03	2	-2.283e-03	6
59	N40	max	-.217	2	-.241	5	.158	1	-2.128e-03	5	8.548e-03	4	-2.477e-03	5
60		min	-.491	4	-.331	3	-.4	5	-3.75e-03	1	3.997e-03	2	-4.959e-03	1
61	N41	max	.38	5	.211	1	.043	4	-2.051e-03	6	2.342e-03	5	4.37e-03	2
62		min	-.316	1	.132	6	.025	3	-8.451e-03	1	-8.639e-03	1	-1.995e-03	6
63	N42	max	-.072	2	-.241	5	.038	2	-2.457e-03	5	8.416e-03	4	-1.492e-03	5
64		min	-.397	4	-.331	3	-.496	4	-3.291e-03	1	3.893e-03	2	-2.073e-03	1
65	N43	max	0	6	0	2	0	2	1.701e-05	2	2.052e-06	4	3.529e-05	2
66		min	0	2	0	6	0	6	-2.259e-06	6	1.334e-06	3	6.509e-06	6
67	N44	max	0	6	0	2	0	6	-1.079e-06	6	6.271e-07	6	4.716e-06	2
68		min	0	5	0	6	0	2	-7.767e-06	2	-2.038e-06	2	-1.743e-06	6
69	N42A	max	.185	4	-.016	5	-.018	2	-1.652e-03	3	1.045e-02	4	6.87e-06	2
70		min	-.01	2	-.04	3	-.298	4	-2.859e-03	4	-1.892e-03	2	-2.889e-03	6



Company : Centek  
 Designer : TJJ  
 Job Number : 20074.64  
 Model Name : CT11011D - Mount

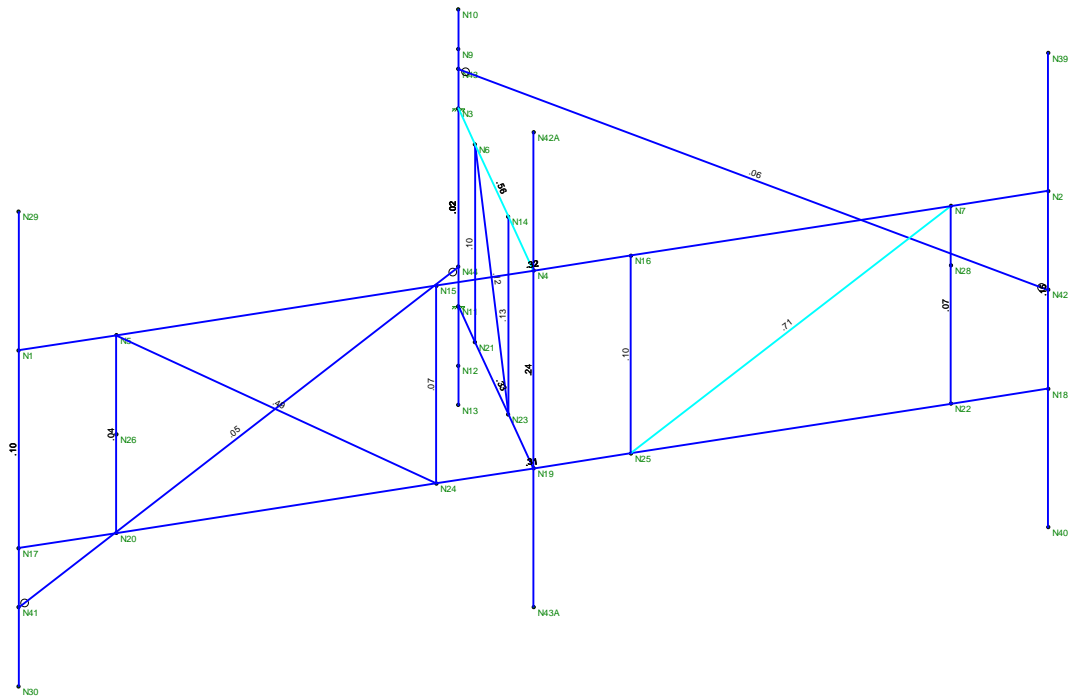
July 28, 2020  
 2:47 PM  
 Checked By: \_\_\_\_\_

**Envelope Joint Displacements (Continued)**

Joint	X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC		
71	N43A	max	.053	5	-.016	5	.175	1	-9.031e-04	5	7.794e-03	5	-1.76e-03	5
72		min	-.16	1	-.04	3	-.137	5	-2.563e-03	1	-4.882e-03	1	-4.432e-03	1

**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	M12	SR 3/4	.705	4....	3	.008	4....	1	1.523	14.314	.179	.179	1	H1-...
2	M7	PIPE 2.5	.558	0	4	.153	0	6	50.531	50.715	3.596	3.596	1.9...	H1-...
3	M9	SR 3/4	.493	0	3	.006	4....	2	1.523	14.314	.179	.179	1	H1-...
4	M8	PIPE 2.5	.328	0	5	.140	2	3	50.531	50.715	3.596	3.596	1.9...	H1-...
5	M15	PIPE 1.25	.321	5.5	1	.109	5.5	1	19.162	19.688	.801	.801	4.0...	H1-...
6	M16	PIPE 1.25	.315	5.5	6	.095	5.5	1	19.162	19.688	.801	.801	3.1...	H1-...
7	M19	PIPE 2.0	.243	1.75	6	.115	4.25	1	20.867	32.13	1.872	1.872	4.8...	H1-...
8	M20	PIPE 2.0	.152	3	2	.032	3	1	20.867	32.13	1.872	1.872	1.4...	H1-...
9	M6	SR 1	.133	0	3	.042	0	1	11.923	25.447	.424	.424	2.2...	H1-...
10	M5	SR 1	.122	2....	3	.030	2....	1	9.593	25.447	.424	.424	2.3...	H1-...
11	M4	SR 1	.103	0	3	.024	0	1	11.923	25.447	.424	.424	2.2...	H1-...
12	M18	PIPE 2.0	.098	1.75	2	.060	1.75	2	20.867	32.13	1.872	1.872	1.3...	H1-...
13	M11	SR 3/4	.096	0	3	.009	0	1	1.523	14.314	.179	.179	1	H1-...
14	M14	SR 1 1/4	.069	2.5	3	.010	2.5	3	24.476	39.761	.828	.828	2.2...	H1-...
15	M10	SR 3/4	.068	0	6	.021	0	2	1.523	14.314	.179	.179	1	H1-...
16	M3	PIPE 1.25	.057	0	2	.026	6....	4	6.822	19.688	.801	.801	1.1...	H1-...
17	M2	PIPE 1.25	.052	3....	1	.042	6....	2	7.073	19.688	.801	.801	1.1...	H1-...
18	M13	SR 1 1/4	.041	0	3	.051	2.5	2	24.476	39.761	.828	.828	2.18	H1-...
19	M1	PIPE 4.0	.017	3.75	2	.013	3.75	2	86.074	93.24	10.631	10.631	2.2...	H1-...



Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

Centek
TJL
20074.64

CT11011D - Mount  
Unity Check

July 28, 2020 at 2:47 PM
Mount Analysis.R3D

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

T-Mobile Existing Facility

Site ID: CT11011D

Westport-SNET LL  
10 Willard Road (SNET LL)  
Norwalk, Connecticut 06851

**August 18, 2020**

**EBI Project Number: 6220003953**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>10.21%</b>



August 18, 2020

T-Mobile

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

Emissions Analysis for Site: CT11011D - Westport-SNET LL

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **10 Willard Road (SNET LL) in Norwalk, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$ , respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 10 Willard Road (SNET LL) in Norwalk, 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) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

- 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) 4 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 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 B4I for the 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24\_43\_U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR3246 B66 for the 2100 MHz channel(s) in Sector A, the Ericsson AIR3246 B66 for the 2100 MHz channel(s), the RFS APXVAARR24\_43\_U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR6449 B4I for the 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR3246 B66 for the 2100 MHz channel(s), the RFS APXVAARR24\_43\_U-NA20 for the 700 MHz / 600 MHz / 600 MHz / 1900 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR6449 B4I for the 2500 MHz / 2500 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 262 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 B4I	Make / Model:	Ericsson AIR3246 B66	Make / Model:	Ericsson AIR3246 B66
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	15.85 dBd	Gain:	15.85 dBd
Height (AGL):	262 feet	Height (AGL):	262 feet	Height (AGL):	262 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):	6,153.47	ERP (W):	6,153.47
Antenna A1 MPE %:	<b>1.34%</b>	Antenna B1 MPE %:	<b>0.32%</b>	Antenna C1 MPE %:	<b>0.32%</b>
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 / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 600 MHz / 600 MHz / 1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	700 MHz / 600 MHz / 600 MHz / 1900 MHz / 1900 MHz / 2100 MHz
Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd	Gain:	13.35 dBd / 12.95 dBd / 12.95 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	262 feet	Height (AGL):	262 feet	Height (AGL):	262 feet
Channel Count:	13	Channel Count:	13	Channel Count:	13
Total TX Power (W):	500 Watts	Total TX Power (W):	500 Watts	Total TX Power (W):	500 Watts
ERP (W):	15,462.91	ERP (W):	15,462.91	ERP (W):	15,462.91
Antenna A2 MPE %:	<b>1.10%</b>	Antenna B2 MPE %:	<b>1.10%</b>	Antenna C2 MPE %:	<b>1.10%</b>
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR3246 B66	Make / Model:	Ericsson AIR6449 B4I	Make / Model:	Ericsson AIR6449 B4I
Frequency Bands:	2100 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	15.85 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	262 feet	Height (AGL):	262 feet	Height (AGL):	262 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):	6,153.47	ERP (W):	25,651.93	ERP (W):	25,651.93
Antenna A3 MPE %:	<b>0.32%</b>	Antenna B3 MPE %:	<b>1.34%</b>	Antenna C3 MPE %:	<b>1.34%</b>

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector B):	2.77%
Sprint	0.25%
Clearwire	0.06%
AT&T	0.57%
SNET/SkyTel/RAM/PageNet	1.21%
Metro PCS	0.44%
MediaFLO	3.87%
XM Sat Radio	0.02%
American Mobile Com.	0.01%
GNARC	0.01%
WSHU-AM	1%
<b>Site Total MPE % :</b>	<b>10.21%</b>

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	2.77%
T-Mobile Sector B Total:	2.77%
T-Mobile Sector C Total:	2.77%
<b>Site Total MPE % :</b>	<b>10.21%</b>

### T-Mobile Maximum MPE Power Values (Sector B)

T-Mobile Frequency Band / Technology (Sector B)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 2100 MHz LTE	4	1538.37	262.0	3.22	2100 MHz LTE	1000	0.32%
T-Mobile 700 MHz LTE	2	648.82	262.0	0.68	700 MHz LTE	467	0.15%
T-Mobile 600 MHz LTE	2	591.73	262.0	0.62	600 MHz LTE	400	0.15%
T-Mobile 600 MHz NR	1	1577.94	262.0	0.83	600 MHz NR	400	0.21%
T-Mobile 1900 MHz LTE	2	2203.69	262.0	2.31	1900 MHz LTE	1000	0.23%
T-Mobile 1900 MHz GSM	4	1101.85	262.0	2.31	1900 MHz GSM	1000	0.23%
T-Mobile 2100 MHz UMTS	2	1294.56	262.0	1.36	2100 MHz UMTS	1000	0.14%
T-Mobile 2500 MHz LTE	2	6412.98	262.0	6.72	2500 MHz LTE	1000	0.67%
T-Mobile 2500 MHz NR	2	6412.98	262.0	6.72	2500 MHz NR	1000	0.67%
						<b>Total:</b>	<b>2.77%</b>

• 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:	2.77%
Sector B:	2.77%
Sector C:	2.77%
T-Mobile Maximum MPE % (Sector B):	2.77%
Site Total:	10.21%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **10.21%** 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.