Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

November 6, 2018

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

RE: **Notice of Exempt Modification for T-Mobile / Crown Site BU: 876323**
T-Mobile Site ID: CTNH506A
Located at: 85 Plainfield Ave, West Haven, CT 06516
Latitude: 41° 18′ 4.59″ / Longitude: -72° 58′ 35.20″

Dear Ms. Bachman:

T-Mobile is requesting to file an Exempt Modification for an existing 148-foot Monopole located at 85 Plainfield Avenue, West Haven CT 06516. T-Mobile currently maintains six (6) antennas at the 144-foot and 146-foot level of the existing 148-foot tower. The monopole is owned by Crown Castle. The property is owned by Sprint. T-Mobile now intends to replace three (3) existing antenna with three (3) proposed antennas and also add three (3) additional new antenna, add (3) RRU on a replacement antenna platform and swap (1) coax for (1) hybrid fiber line.

This facility was approved by the Connecticut Siting Council in Petition No. 878 on February 19, 2009. This approval included the extension of the tower from 138' to 148' with no conditions.

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.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Edward M. O'Brien, Mayor, City of West Haven, the Department of Planning and Development for the City of West Haven, as well as the tower and property owner.

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

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

3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: William Stone.

Sincerely,

William Stone
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
518-373-3543
William.stone@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

The Honorable Edward M. O'Brien
City Hall 355 Main Street
3rd Floor
West Haven, CT 06516

Department of Planning and Development
City Hall 355 Main Street
1st Floor
West Haven, CT 06516

Sprint
PMB 331 4017 Washington Rd
McMurray, PA 15317

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3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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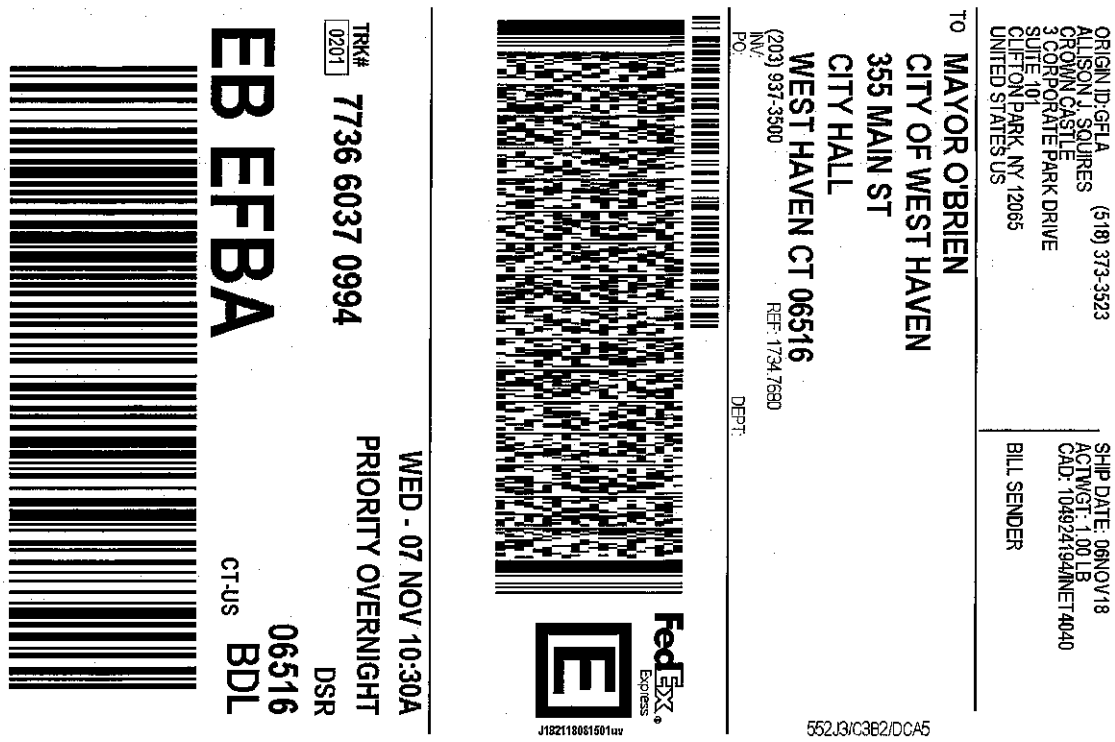

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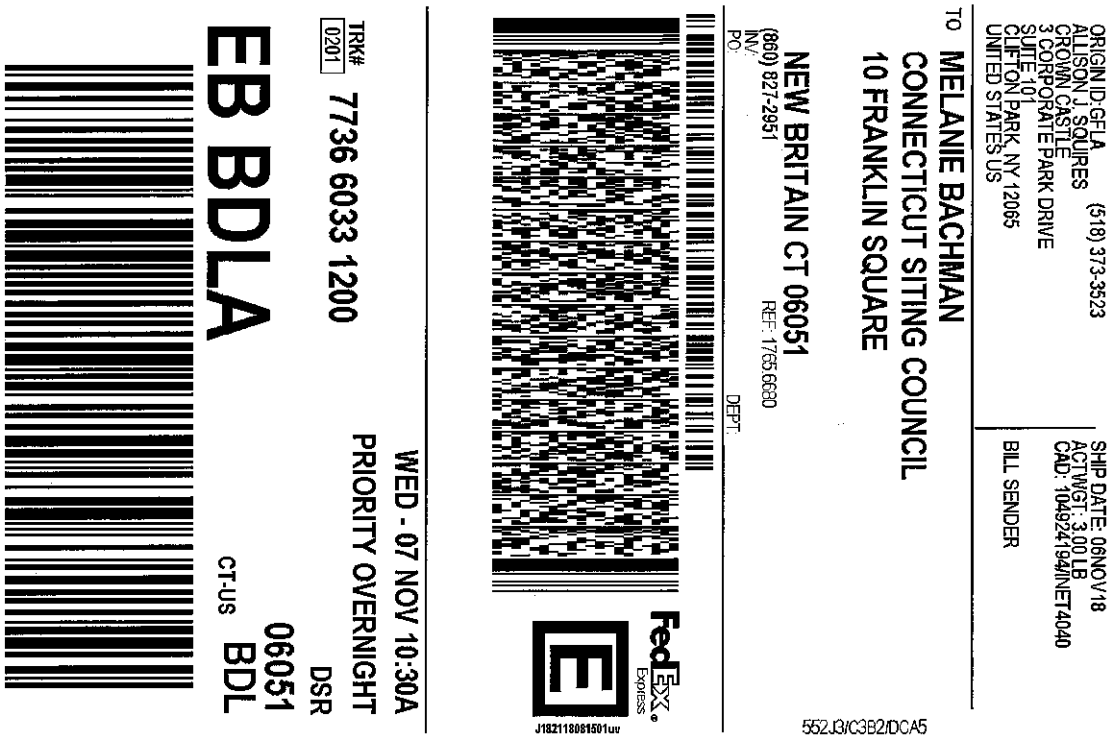

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Petition No. 878
Pocket Communications
85 Plainfield Avenue, West Haven
February 19, 2009
Staff Report

On December 15, 2008, the Connecticut Siting Council (Council) received a Petition (Petition) from Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications (Pocket) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to an existing telecommunications facility located at 85 Plainfield Avenue, West Haven. Specifically, Pocket seeks to extend the 138-foot Crown Castle-owned monopole to 148 feet tall. Pocket would install three flush mounted panel antennas at the 146-foot level of the extended tower.

The total height with appurtenances would be approximately 151 feet tall. A Professional Engineer duly licensed in the State of Connecticut has certified that the tower is structurally adequate to support the proposed loading. The maximum worst case power density would be 32.1 percent of the applicable limit.

Pocket would also install a Nortel CDMA Micro BTS equipment cabinet on an H-frame to be located inside the existing fenced compound.

The site is in a wooded area. To the east is Plainfield Avenue and undeveloped land across the street. To the north and west is open (wooded) space. To the south is a parking lot, Maltby Avenue and a residential neighborhood. There are no wetlands at the site.

The tower is currently visible on portions of Plainfield Avenue, Maltby Street, and Timberland Drive. The tower extension is expected to visible from these areas as well. On January 9, 2009, Pocket submitted a notice to abutting property owners with a deadline for reply of January 23, 2009. To date, Pocket has received two inquiries about the project, but neither were opposed. No abutters have contacted the Council's office with any replies. No comments have been received by the City of West Haven either.

This Petition was field reviewed by Dr. Barbara Bell and Mike Perrone of the Council staff on January 12, 2009. Attorney Carrie Larson from Pullman and Comley, LLC (representing Pocket) and Eric Dahl, site acquisition specialist also attended the field review.

City of West Haven, CT
Property Listing Report

Parcel ID 067-0005-0-CELL

Account 00067597

Property Information

Owner	SPRINT
Co-Owner	
Address	85 PLAINFIELD AVE
Mailing Address	PMB 331 4017 WASHINGTON RD MCMURRAY PA 15317
Land Use	431V TEL REL TW MDL-00
Land Class	I

Vision ID	102768
Census Tract	
Neighborhood	
Zoning Code	
Acreage	0
Utilities	

Photo

Sketch

Primary Construction Details

Actual Year Built	
Effective Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	0

Report Created On 9/11/2017

City of West Haven, CT
Property Listing Report

Parcel ID 067-0005-0-CELL

Account 00067597

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	0	0
Outbuildings	453600	317520
Improvements	453600	317520
Extras	0	0
Land	0	0
Total	453600	317520

Outbuilding and Extra Items

Description	Units
CELL SHED	360 S.F.
TOWER	2 SITES
FENCE-8' CHAIN	400 L.F.

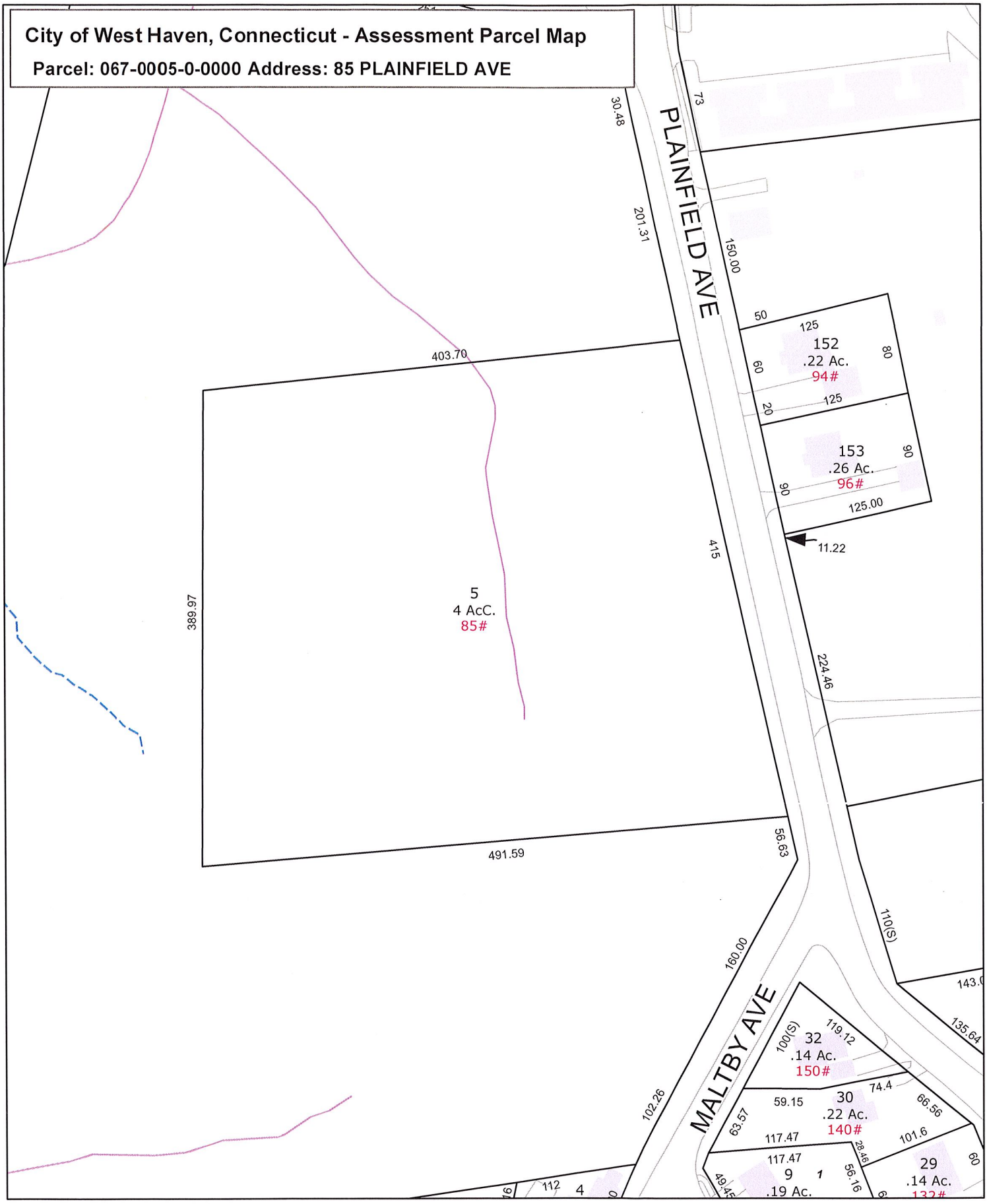
Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SPRINT	000/ 000		
SPRINT	000/ 000		0

Report Created On 9/11/2017


City of West Haven, Connecticut - Assessment Parcel Map
Parcel: 067-0005-0-0000 Address: 85 PLAINFIELD AVE
PLAINFIELD AVE
MALTBY AVE
30.48
201.31
150.00
73
403.70
389.97
415
491.59
56.63
160.00
102.26
224.46
110(S)
5
4 AcC.
85#
152
.22 Ac.
94#
153
.26 Ac.
96#
125.00
11.22
32
.14 Ac.
150#
100(S)
119.12
30
.22 Ac.
140#
59.15
74.4
66.56
63.57
117.47
101.6
28.46
56.16
9
.19 Ac.
29
.14 Ac.
49.45
112
4
N
Approximate Scale: 1 inch = 100 feet
0 30 60 120 180 240
Feet
Map Produced: January 2015
Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The City of West Haven and its mapping contractors
assume no legal responsibility for the information
contained herein.

SHEET INDEX

TOWER OWNER NOTIFICATION

ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

T-Mobile

CROWN CASTLE

CBU

876323

SITE ID

CTNH506A

SITE NAME

CROWN WEST HAVEN MONOPOLE

SITE ADDRESS

85 PLAINFIELD AVE
WEST HAVEN, CT 06516

CONFIGURATION

67D95FDB_1xAIR+1QP+1OP

PROJECT SITE INFORMATION

SITE ID:	CTNH506A
SITE NAME:	CROWN WEST HAVEN MONOPOLE
SITE ADDRESS:	85 PLAINFIELD AVE WEST HAVEN, CT 06516
PERMITTING JURISDICTION:	NEW HAVEN COUNTY
COUNTY:	NEW HAVEN
ZONING:	TBD
SITE COORDINATES:	
LATITUDE:	N 41° 18' 04.6" (41.3012800000) (NAD 83)
LONGITUDE:	W 72° 58' 35.2" (-72.9764400000) (NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **TOWER** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS FROM TOWER OWNER PRIOR TO ANY CONSTRUCTION.

ANTENNA MOUNTS

BASED ON THE MOUNT ANALYSIS COMPLETED BY **TECTONIC** DATED **09/28/18**. THE EXISTING ANTENNA MOUNTS ARE CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION WITH THE FOLLOWING MODIFICATIONS:

- **GC TO REPLACE EXISTING MOUNT WITH SITE PRO 1 #RMQP-496-HK. ALL PROPOSED AND RETAINED ANTENNAS TO BE CENTERED ON PLATFORM. RRUs TO BE MOUNTED BEHIND ANTENNAS.**

PROJECT TEAM INFORMATION

CLIENT REPRESENTATIVE:	CROWN CASTLE 3 CORPORATE PARK DRIVE SUITE 101 CLIFTON PARK, NY 12065
CLIENT REP. CONTACT:	WILL STONE (518) 373-3543
ENGINEER:	INFINIGY 6865 DEERPATH ROAD SUITE 152 ELKRIDGE, MD 21075
ENGINEER CONTACT:	MATTHEW LIVERETTE (518) 690-0790

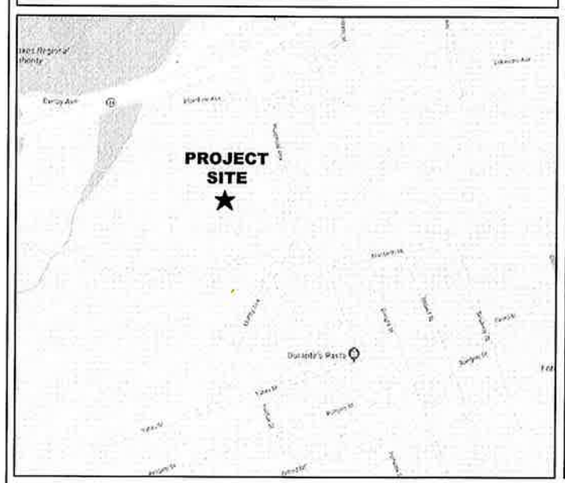
SCOPE OF WORK

SCOPE OF WORK:
TMO L700 4X2 67D95FDB (CONNECTICUT MARKET) REPLACING (3) EXISTING ANTENNAS WITH. NEW MODELS AND ADDING (3) NEW ANTENNAS- ONE PER SECTOR. REMOVING (1) COAX LINE AND.REPLACING WITH (1) HYBRID FIBER CABLE. ADDING (3) RRUS. REMOVING (3) BIAST. REPLACE EXISTING MOUNTS WITH PROPOSED MOUNT.
CURRENT INSTALL: (6) ANTENNAS, (12) COAX, (1) HYBRID FIBER CABLE, AND (3) BIAST. GROUND CHANGES:
REPLACE (1) EXISTING CABINET WITH NEW MODEL
FINAL CONFIGURATION: (9) ANTENNAS, (11) COAX, (2) HYBRID FIBER CABLES, AND (3) RRUS.

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG
TOLL FREE: 1-800-922-4455 OR www.cbyd.com
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LOCATION MAP



GENERAL NOTES

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRH AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
- THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON STORMWATER DRAINAGE.
- NO SANITARY SEWER, POTABLE WATER, OR TRASH DISPOSAL SERVICE IS REQUIRED
- NO COMMERCIAL SIGNAGE IS PROPOSED

CODE COMPLIANCE

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

- INTERNATIONAL BUILDING CODE
- NATIONAL ELECTRICAL CODE
- NATIONAL FIRE PROTECTION ASSOCIATION 101
- NATIONAL FIRE PROTECTION ASSOCIATION 1
- LOCAL BUILDING CODES
- CITY/COUNTY ORDINANCES
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
- UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.
- ANSI EIA/TIA 222 REV. G
- TIA 607
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
- IEEE C2 (LATEST EDITION)
- TELCORDIA GR-1275
- ANSI T1.311

T-Mobile

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY

6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
10/4/2018

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	10/03/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title: CTNH506A CROWN WEST HAVEN MONOPOLE
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

Prepared For: CROWN CASTLE

Drawing Title: **TITLE PAGE**

Drawing Number: **T1**

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: T-MOBILE CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE T-MOBILE WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY T-MOBILE TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR T-MOBILE PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO T-MOBILE OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.
- C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
- D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
- E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
- F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
- G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ROOTS, SOD, RUBBING, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
M	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR ⊗	GROUND ROD
OR ⊠	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
	DC POWER AND FIBER OPTIC TRUNK CABLES
E	DC POWER CABLES
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

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STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
OCT 04 2018

No.	Submittal / Revision	Appd	Date
0	ISSUED FOR CONSTRUCTION	SL	10/03/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

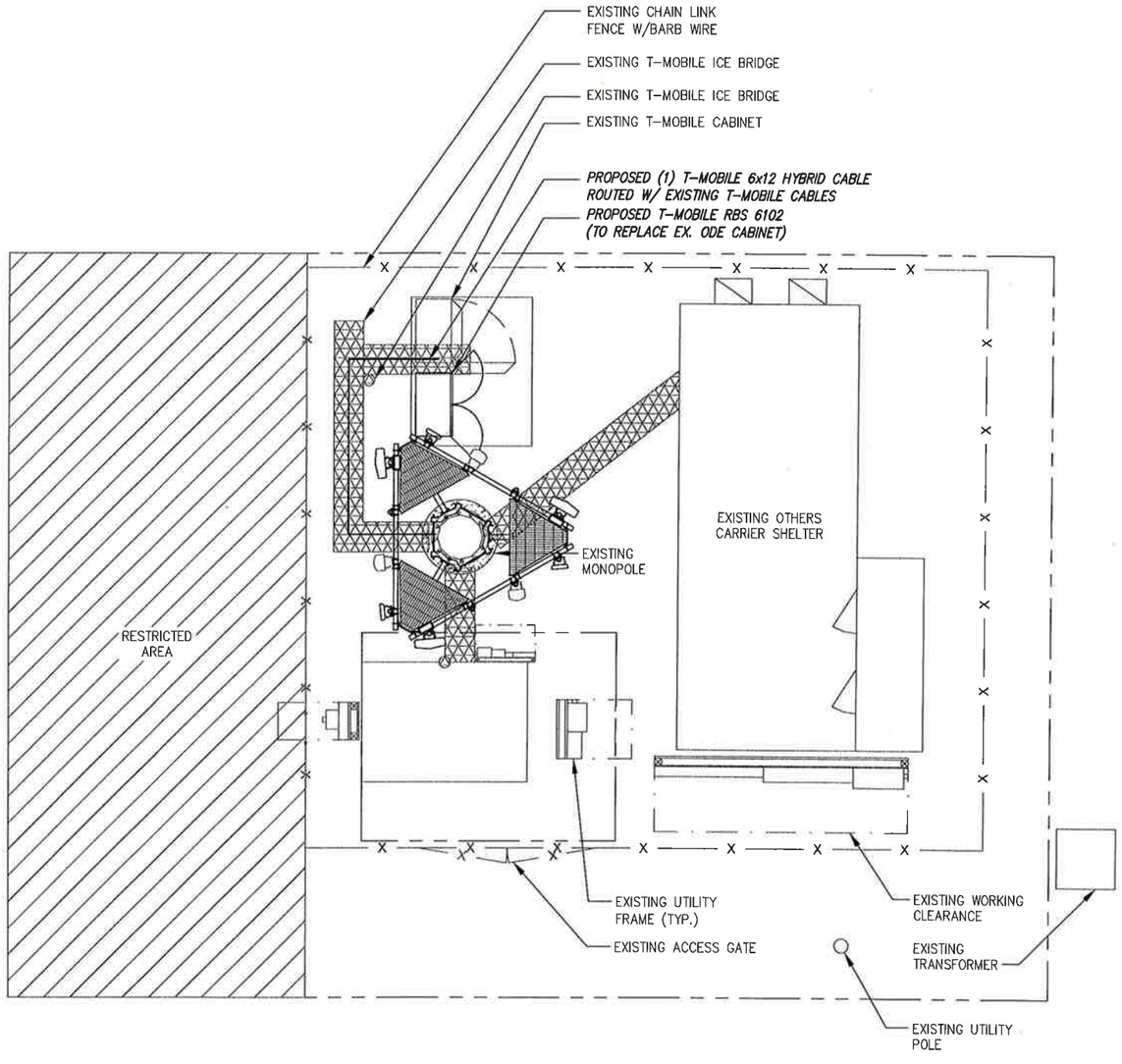
Project Number: 600-007

Project Title:
CTNH506A
CROWN WEST HAVEN MONOPOLE
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

Prepared For:
CROWN CASTLE

Drawing Title
NOTES

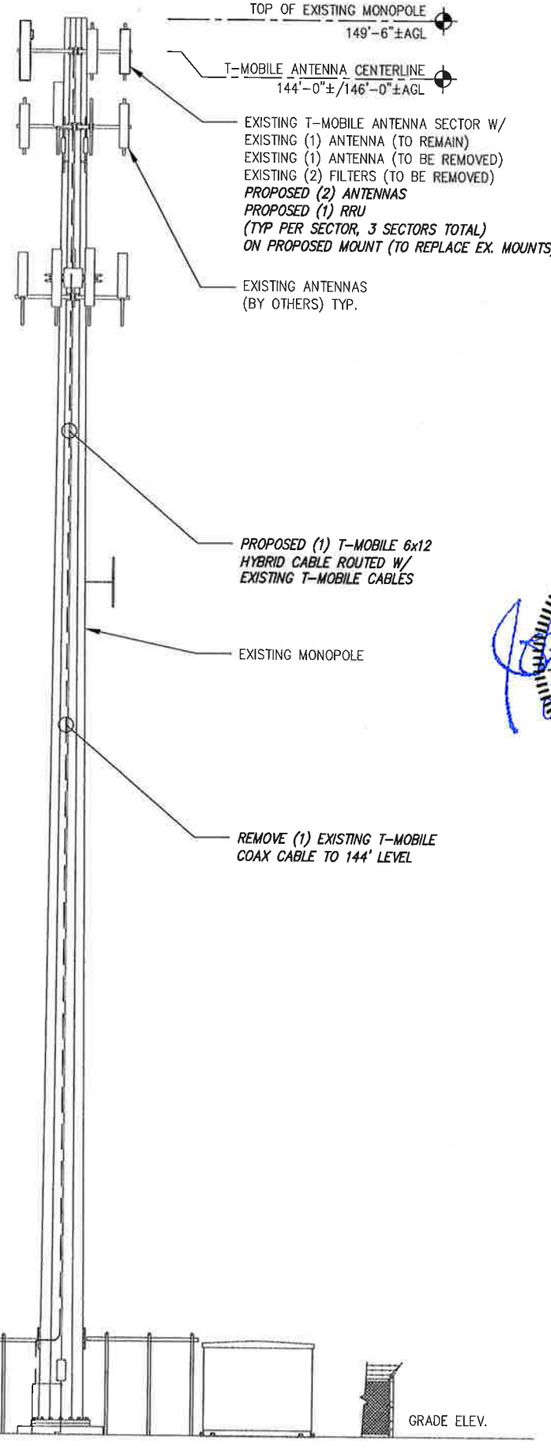
Drawing Number
N1



NORTH

1 / C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:
10' 5' 0 5' 10'
SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"



2 / C1 ELEVATION
SCALE: NOT TO SCALE

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PLAN AND ELEVATION

Drawing Number
C1

SECTOR	ANTENNA POSITION	ANTENNA MODEL #	VENDOR	AZIMUTH	M-TILT	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL #	CABLE LENGTH	CABLE TYPE AND QUANTITY
ALPHA	A-1	**APX16DWV-16DWV-S-E-A20**	**RFS**	**30°**	0	2	146'-0"	-	200'±	(2) 1-5/8" COAX
	A-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	30°	0	2/2/2/2	146'-0"	-	200'±	(1) EXISTING 6x12 HCS (SHARED)
	A-3	**APXVAARR24_43-U-NA20**	**RFS**	**30°**	0	2/2	144'-0"	**RADIO 4449 B71+B12**	**200±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
BETA	B-1	**APX16DWV-16DWV-S-E-A20**	**RFS**	**175°**	0	2	146'-0"	-	200'±	(2) 1-5/8" COAX
	B-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	175°	0	2/2/2/2	146'-0"	-	200'±	(1) EXISTING 6x12 HCS (SHARED)
	B-3	**APXVAARR24_43-U-NA20**	**RFS**	**175°**	0	2/2	144'-0"	**RADIO 4449 B71+B12**	**200±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
GAMMA	C-1	**APX16DWV-16DWV-S-E-A20**	**RFS**	**265°**	0	2	146'-0"	-	200'±	(2) 1-5/8" COAX
	C-2	AIR32 KRD901146-1_B66A_B2A	ERICSSON	265°	0	2/2/2/2	146'-0"	-	200'±	(1) EXISTING 6x12 HCS (SHARED)
	C-3	**APXVAARR24_43-U-NA20**	**RFS**	**265°**	0	2/2	144'-0"	**RADIO 4449 B71+B12**	**200±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**

1 / C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY

EXISTING
PROPOSED

ANTENNA LOCATION KEY

VIEWED FROM BEHIND

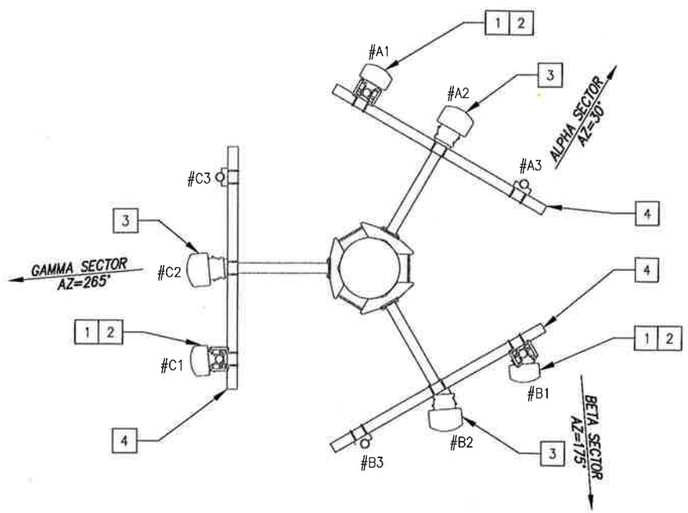
#1 #2 #3

GENERAL NOTES:

1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS FOR ANY PROPOSED CABLES/JUMPERS PRIOR TO CONSTRUCTION.

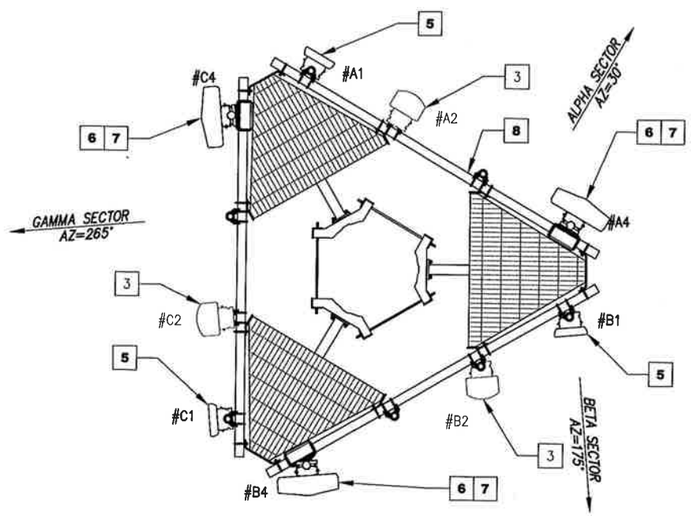
ORIENTATION PLAN KEY

KEY	DESCRIPTION	TYPE	QTY	STATUS
1	SBNH-1D65C	ANTENNA	3	REMOVED
2	FILTER	FILTER	6	REMOVED
3	AIR32 KRD901146-1_B66A_B2A	ANTENNA	2	REMAIN
4	T-BOOM MOUNT	MOUNT	3	REMOVED
5	**APX16DWV-16DWV-S-E-A20**	**ANTENNA**	**3**	**PROPOSED**
6	**APXVAARR24_43-U-NA20**	**ANTENNA**	**3**	**PROPOSED**
7	**RADIO 4449 B71+B12**	**RRU**	**3**	**PROPOSED**
8	**SP 1 #RMQP-496HK**	**MOUNT**	**1**	**PROPOSED**



NORTH

2 / C2 EXISTING ANTENNA ORIENTATION
SCALE: NOT TO SCALE



NORTH

3 / C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

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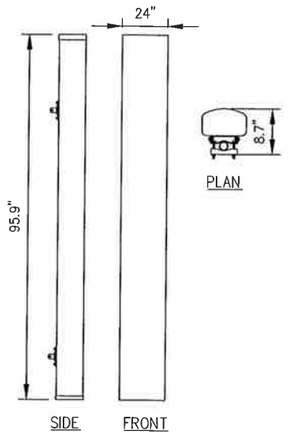
Prepared For: CROWN CASTLE

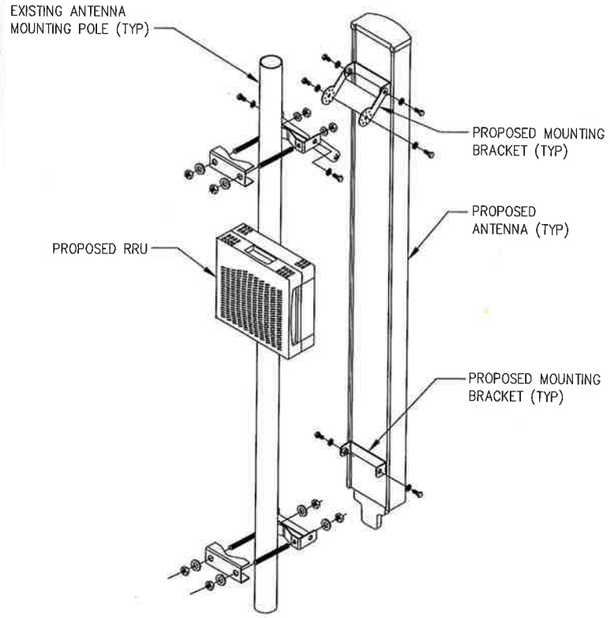
Drawing Title
RF CHART

Drawing Number
C2

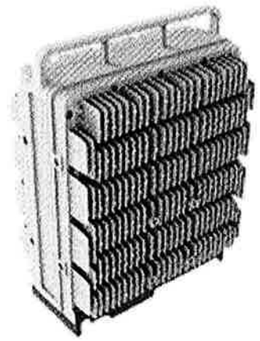


RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.7"
WEIGHT, W/O MOUNTING KIT:	128 LBS

1/D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE



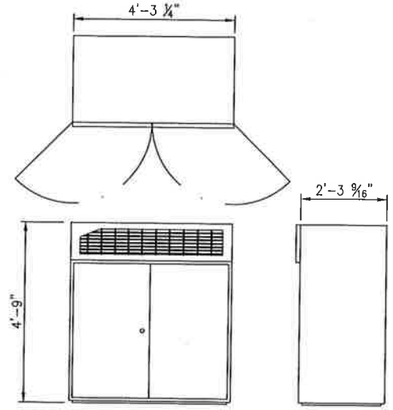
2/D1 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE



ERICSSON 4449 B71+B12 SPECIFICATIONS

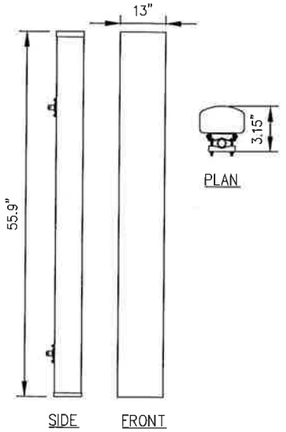
- HxWxD, (INCHES) : 17.91"x13.19"x10.63"
- WEIGHT (LBS) : 74.96
- COLOR : GRAY

3/D1 4449 B71+B12 RRU DETAIL
SCALE: NOT TO SCALE



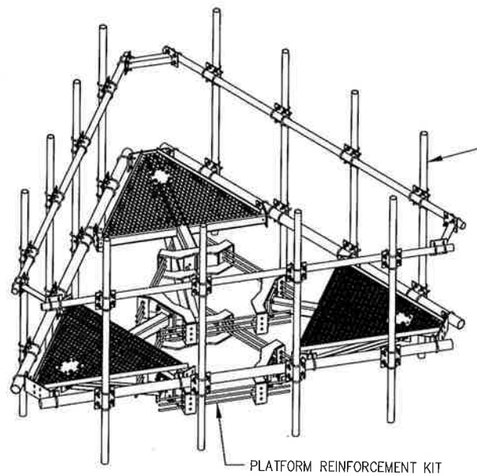
ERICSSON MODEL NO.:	RBS 6102
DIMENSIONS, HxWxD:	4'-9"x4'-3 ¼"x2'-3 9/16"
WEIGHT:	772 LBs (W/O BATTERIES)

4/D1 RBS 6102 DETAIL
SCALE: NOT TO SCALE



RFS MODEL NO.:	APX16DWV-16DWV-S-E-A20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	55.9"x13"x3.15"
WEIGHT, W/O MOUNTING KIT:	40.7 LBS

5/D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE



SITE PRO 1 MODEL NO.:	RMQP-496-HK
FACE WIDTH:	12'-6"
WEIGHT W/O MOUNTING PIPES:	2,449LBS

6/D1 ANTENNA MOUNT DETAIL
SCALE: NOT TO SCALE

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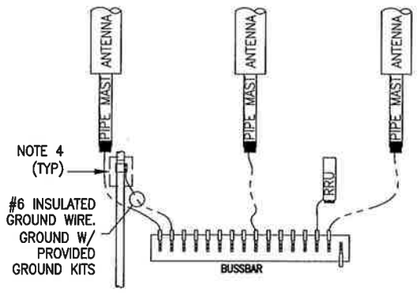
Prepared For:
CROWN CASTLE

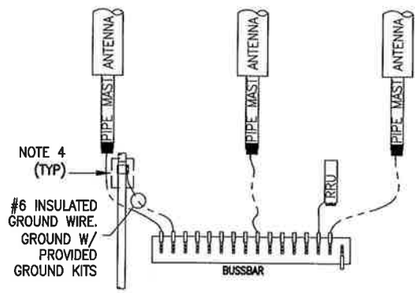
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

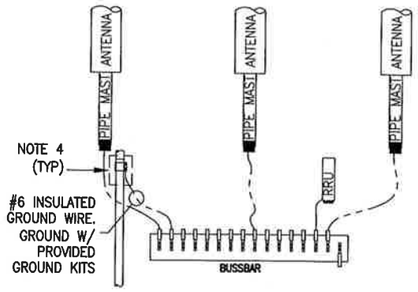
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

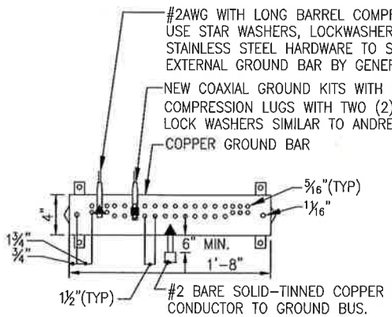


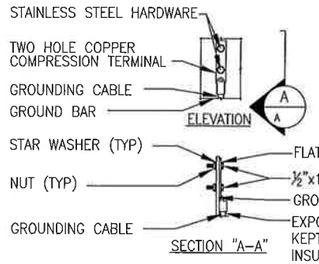
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



NOTES:
1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. PROVIDE BONDING AND GROUNDING CONDUCTORS WITH GREEN TYPE THWN INSULATION, U.O.N.
3. PROVIDE SOLID TINNED BARE COPPER WIRE (BCW) GROUNDING CONDUCTOR.
4. PROVIDE STANDARD COAX OR HYBRID CABLE GROUNDING KIT OR FIELD FABRICATE TO SUIT CONDITIONS. TOTAL LENGTH OF GROUNDING CONDUCTOR SHALL NOT EXCEED 10'–0".
5. PROVIDE GROUNDING ELECTRODES QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
6. LEAVE GROUND WIRE COILED UP ABOVE GRADE. CAP END OF CONDUIT.
7. ADD COAX OR HYBRID CABLE GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF CABLE TRAY (FROM TOWER OR MONOPOLE TO EQUIPMENT) IS GREATER THAN 20'–0".
8. ADD #2/0 GREEN INSULATED CONDUCTOR BETWEEN CABLE TRAY AND GRIPSTRUT/COVER.
9. BUSSBARS ARE TO BE TINNED COPPER BARS (¼"X2"X12") MOUNTED ON INSULATORS, U.O.N.
10. GROUND ALL PROPOSED ANTENNAS, DIPLEXERS, TMAS, AND RRUS PER MANU. SPECS.

1 / E1 GROUNDING DIAGRAM
SCALE: NOT TO SCALE

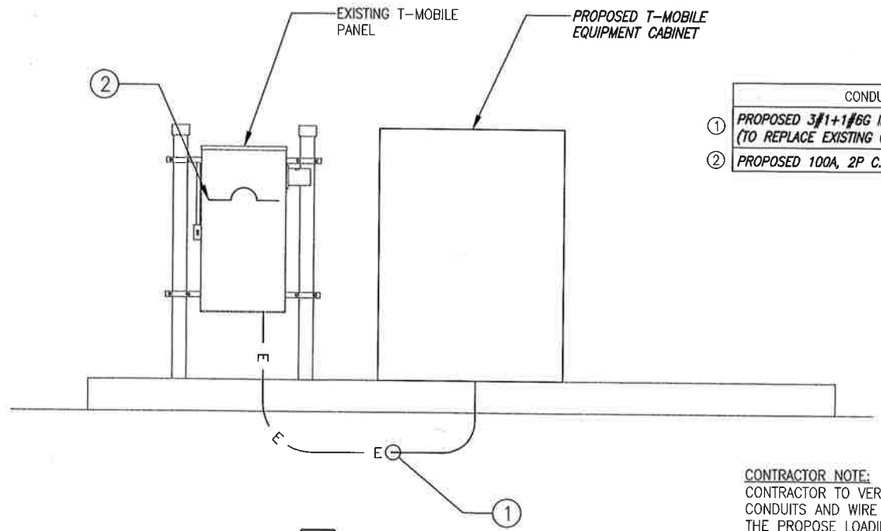




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR–SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR–SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

2 / E1 GROUND BAR CONNECTION DETAIL
SCALE: NOT TO SCALE



CONDUIT SCHEDULE
① PROPOSED 3#1+1#6G IN 1–1/2" CONDUIT (TO REPLACE EXISTING CONDUCTOR AND CONDUIT)
② PROPOSED 100A, 2P C.B.

3 / E1 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

CONTRACTOR NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSE LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6885 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
10/3/2018

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	10/03/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

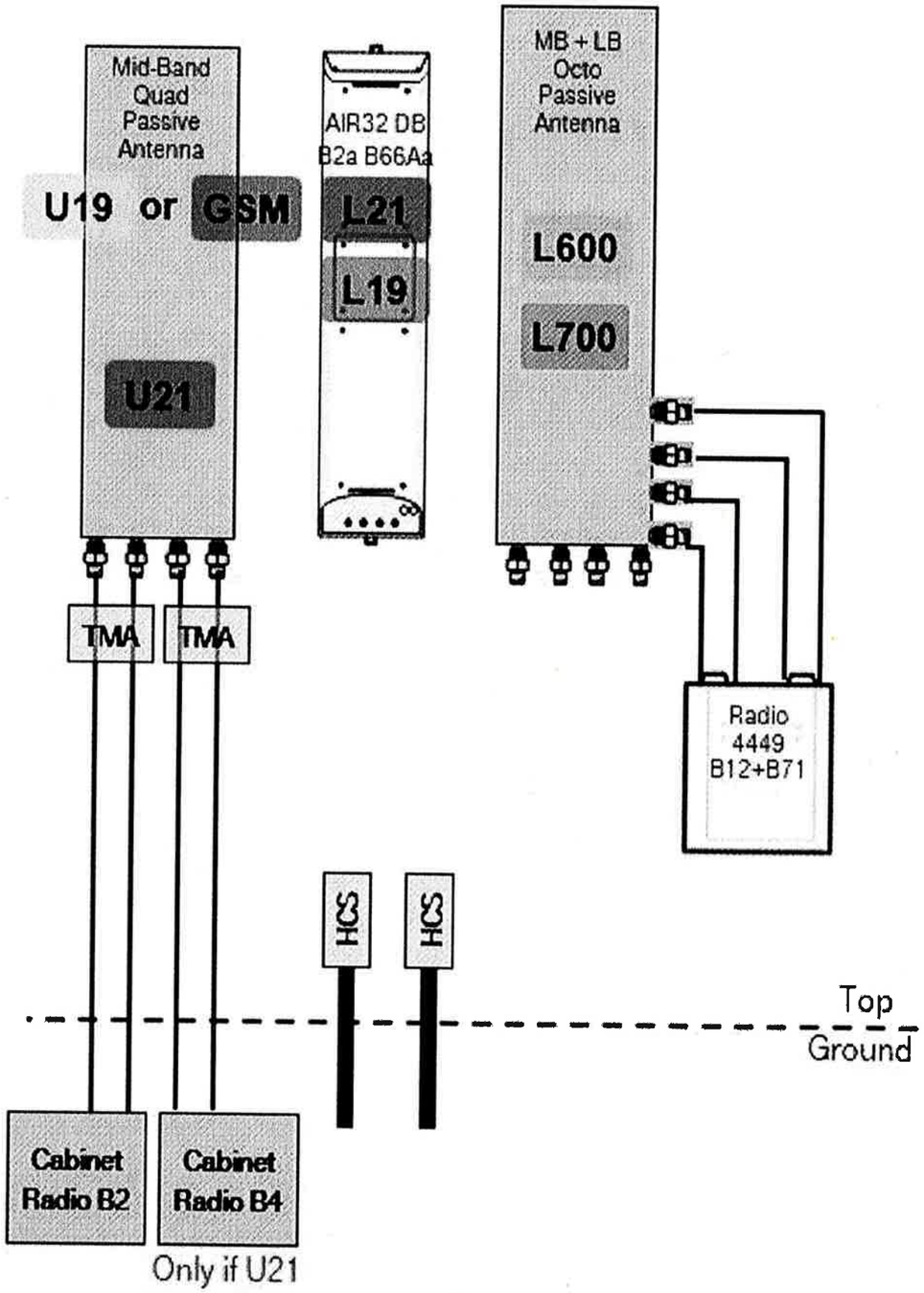
Project Number: 600-007

Project Title:
CTNH506A
CROWN WEST HAVEN MONOPOLE
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

Prepared For: CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1



1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
10.4.2018

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	10/03/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
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CROWN WEST
HAVEN MONOPOLE
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

Prepared For: CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

Date: **October 03, 2018**

Denice Nicholson
Crown Castle
3 Corporate Park Drive Suite 101
Clifton Park, NY 12065

B+T Group
1717 S.Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Metro PCS* Co-Locate**	
	Carrier Site Number:	CTNH506A
	Carrier Site Name:	Crown West Haven Monopole
Crown Castle Designation:	**Crown Castle BU Number:**	876323
	Crown Castle Site Name:	Hillside
	Crown Castle JDE Job Number:	509417
	Crown Castle Work Order Number:	1642329
	Crown Castle Order Number:	443729 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	82071.003.01
Site Data:	**85 Plainfield Ave, West Haven, New Haven County, CT** **Latitude *41° 18' 4.59"*, Longitude *-72° 58' 35.2"*** **148 Foot - Monopole Tower**	

Dear Denice Nicholson,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2016 Connecticut State Building Code. Exposure Category B and Risk Category II were used in this analysis.

Structural analysis prepared by: Jason Brock, E.I.

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2019

Scott S. Vance, P.E.

tnxTower Report - version 8.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft. Monopole tower designed by Summit in June of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. This tower has been modified by PJF in October of 2015 and those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

Building Code:	2016 Connecticut State Building Code (2012 IBC)
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.275 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
146.0	146.0	3	Ericsson	AIR -32 B2A/B66AA	11 2	1-5/8 1-3/8
		3	Rfs Celwave	APX16DWV-16DWVS-E-A20		
		1	SitePro1	HRK-12		
		1	SitePro1	RMQP-496		
	144.0	3	Ericsson	RADIO 4449 B12/B71		
		3	Rfs Celwave	APXVAARR24_43-U-NA20		

Table 2 – Non-Carrier Equipment To Be Conditionally Removed

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
136.0	136.0	3	Alcatel Lucent	800 External Notch Filter	--	--
		6		1900MHZ RRH (65MHZ)		
		3		800MHZ RRH		

Table 3 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	141.0	3	Argus Tech.	LLPX310R-V1	4 3 3	1-1/4 1/2 5/16
	140.0	3	Alcatel Lucent	RRH2X50-800		
		3	Alcatel Lucent	TD-RRH8X20-25		
		3	Commscope	DT465B-2XR		
	139.0	1	Andrew	FPA5150-23PM-1		
	138.0	18	Rfs Celwave	ACU-A20-N		
		3	Samsung Telecomm.	FDD_R6_RRH		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	--	Miscellaneous [NA 507-1]		
		1	--	Platform Mount [LP 303-1]		
	134.0	2	Andrew	VHLP2-11		
122.0	122.0	1	Rfs Celwave	TMA-DB-T1-6Z-8AB-0Z	--	--
		1	--	Side Arm Mount [SO 102-1]		
120.0	126.0	1	Gps	GPS_A	12 1	1-5/8 1/2
	122.0	3	Alcatel Lucent	RRH2X40-AWS		
		3	Antel	BXA-171063-8BF-EDIN-0		
		2	Antel	BXA-80063/4CF		
		1	Antel	BXA-80063/6CF		
		3	Commscope	LNX-6514DS-A1M		
		2	Rfs Celwave	FD9R6004/2C-3L		
		3	Rymsa Wireless	MG D3-800TV		
	120.0	1	--	Platform Mount [LP 1201-1]		
90.0	90.0	1	Lucent	KS24019-L112A	1	1/2
		1	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	Metro PCS Co- Locate, Rev # 0	443729	CCI Sites
Tower Manufacturer Drawing	PJF, Job No. 29297-288	1615021	CCI Sites
Tower Extension Drawing	PSG, Date: 02/06/2009	2384593	CCI Sites
Tower Modification Drawing	PJF, Date: 10/26/2015	5957618	CCI Sites
Post Modification Inspection	SGS, Date: 05/06/2016	6254609	CCI Sites
Mount Analysis Report	Tectonic, Project No. 9500.876323	7886534	CCI Sites
Foundation Drawing	PJF, Job No. A29297-288	1614608	CCI Sites
Geotech Report	FDH, Project No. 1205093EG1	2134228	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 08/10/2018	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 143	Pole	TP24x24x0.25	1	-3.451	791.514	3.4	Pass
L2	143 - 138	Pole	TP24x24x0.25	2	-3.848	791.514	9.0	Pass
L3	138 - 133	Pole	TP23.05x22x0.25	3	-6.940	1302.777	15.2	Pass
L4	133 - 128	Pole	TP24.1x23.05x0.25	4	-7.423	1362.784	21.1	Pass
L5	128 - 123	Pole	TP25.15x24.1x0.25	5	-7.929	1419.978	26.2	Pass
L6	123 - 118	Pole	TP26.201x25.15x0.25	6	-11.644	1464.855	32.9	Pass
L7	118 - 113	Pole	TP27.251x26.201x0.25	7	-12.310	1508.524	39.4	Pass
L8	113 - 108	Pole	TP28.301x27.251x0.25	8	-13.001	1550.976	45.1	Pass
L9	108 - 103	Pole	TP29.351x28.301x0.25	9	-13.716	1592.209	50.4	Pass
L10	103 - 98	Pole	TP30.401x29.351x0.25	10	-14.456	1632.235	55.1	Pass
L11	98 - 94.75	Pole	TP31.924x30.401x0.25	11	-14.948	1657.593	57.9	Pass
L12	94.75 - 89.75	Pole	TP31.634x30.584x0.3125	12	-16.288	2229.307	48.1	Pass
L13	89.75 - 84.75	Pole	TP32.684x31.634x0.3125	13	-17.195	2285.335	50.9	Pass
L14	84.75 - 79.75	Pole	TP33.735x32.684x0.3125	14	-18.127	2340.145	53.4	Pass
L15	79.75 - 74.75	Pole	TP34.785x33.735x0.3125	15	-19.084	2393.737	55.7	Pass
L16	74.75 - 74.5	Pole	TP34.837x34.785x0.3125	16	-19.139	2396.394	55.8	Pass
L17	74.5 - 74.25	Pole	TP34.89x34.837x0.3125	17	-19.187	2399.040	55.9	Pass
L18	74.25 - 69.25	Pole	TP35.94x34.89x0.3125	18	-20.166	2451.298	58.1	Pass
L19	69.25 - 64.25	Pole	TP36.99x35.94x0.3125	19	-21.174	2502.349	60.0	Pass
L20	64.25 - 59.25	Pole	TP38.04x36.99x0.3125	20	-22.207	2552.182	61.9	Pass
L21	59.25 - 54.25	Pole	TP39.091x38.04x0.3125	21	-23.213	2600.797	63.8	Pass
L22	54.25 - 50	Pole	TP41.086x39.091x0.3125	22	-24.134	2641.170	65.4	Pass
L23	50 - 43.75	Pole	TP40.671x39.358x0.375	23	-26.506	3381.525	55.0	Pass
L24	43.75 - 38.75	Pole	TP41.721x40.671x0.375	24	-27.782	3445.743	56.1	Pass
L25	38.75 - 33.75	Pole	TP42.771x41.721x0.375	25	-29.084	3508.753	57.2	Pass
L26	33.75 - 28.75	Pole	TP43.822x42.771x0.375	26	-30.414	3570.535	58.3	Pass
L27	28.75 - 23.75	Pole	TP44.872x43.822x0.375	27	-31.771	3631.120	59.3	Pass
L28	23.75 - 18.75	Pole	TP45.922x44.872x0.375	28	-33.155	3690.477	60.2	Pass
L29	18.75 - 13.75	Pole	TP46.972x45.922x0.375	29	-34.565	3748.626	61.0	Pass
L30	13.75 - 8.75	Pole	TP48.022x46.972x0.375	30	-36.002	3805.557	61.9	Pass
L31	8.75 - 3.75	Pole	TP49.072x48.022x0.375	31	-37.465	3861.270	62.6	Pass
L32	3.75 - 0	Pole	TP49.86x49.072x0.375	32	-38.579	3902.262	63.2	Pass
							Summary	
						Pole (L22)	65.4	Pass
						Rating =	65.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Extension Flange Connection	138	29.1	Pass
1	Transition Plate Flange Connection	138	30.1	Pass
1	Anchor Rods	Base	69.0	Pass
1	Base Plate	Base	51.4	Pass
1	Base Foundation (Structure)	Base	42.2	Pass
1	Base Foundation (Soil Interaction)	Base	45.0	Pass

Structure Rating (max from all components) =	**69.0%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5

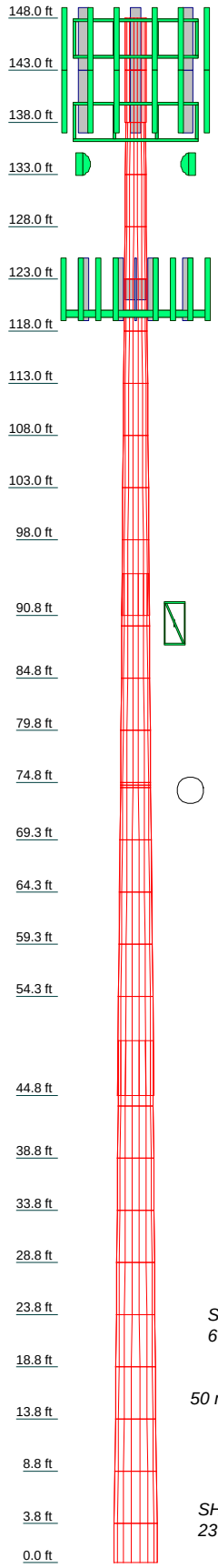
4.1) Recommendations

Once the equipment in Table 2 is removed, the tower and its base foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

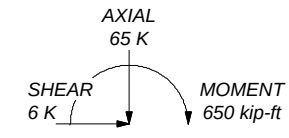
APPENDIX A

TNXTOWER OUTPUT

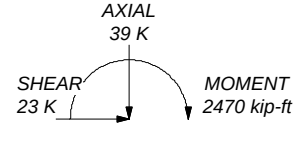
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.000	0	0.250		24.000	24.000	A500-50	0.3
2	5.000	0	0.250		24.000	24.000		0.3
3	5.000	18	0.250		22.000	23.050		0.3
4	5.000	18	0.250		23.050	24.100		0.3
5	5.000	18	0.250		24.100	25.150		0.3
6	5.000	18	0.250		25.150	26.201		0.3
7	5.000	18	0.250		26.201	27.251		0.4
8	5.000	18	0.250		27.251	28.301		0.4
9	5.000	18	0.250		28.301	29.351		0.4
10	5.000	18	0.250		29.351	30.401		0.4
11	5.000	18	0.250	4.000	30.401	31.924		0.6
12	5.000	18	0.313		31.924	32.684		0.5
13	5.000	18	0.313		32.684	33.735		0.5
14	5.000	18	0.313		33.735	34.785		0.6
15	5.000	18	0.313		34.785	35.940		0.6
16	5.000	18	0.313		35.940	36.990		0.6
17	5.000	18	0.313		36.990	38.040		0.6
18	5.000	18	0.313		38.040	39.091		0.6
19	5.000	18	0.313		39.091	40.141		0.6
20	5.000	18	0.313		40.141	41.192		0.6
21	5.000	18	0.313		41.192	42.242		0.6
22	6.250	18	0.313	5.250	42.242	43.293		1.3
23	6.250	18	0.375		43.293	44.343		1.0
24	5.000	18	0.375		44.343	45.393		0.8
25	5.000	18	0.375		45.393	46.443		0.8
26	5.000	18	0.375		46.443	47.493		0.9
27	5.000	18	0.375		47.493	48.543		0.9
28	5.000	18	0.375		48.543	49.593		0.9
29	5.000	18	0.375		49.593	50.643		0.9
30	5.000	18	0.375		50.643	51.693		1.0
31	5.000	18	0.375		51.693	52.743		1.0
32	3.750	18	0.375		52.743	53.793	A607-60	0.7
								19.0



ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 1.275 in ICE



TORQUE 0 kip-ft
REACTIONS - 125 mph WIND

D□□□□ □□D□□□□R□□□□□□□□□□ □D□□

□□□□	□□□□□□□□	□□□□	□□□□□□□□
Miscellaneous [NA 507-1] (HRK-12)	148	6' x 2" Mount Pipe (E-DISHES)	138
AIR -32 B2A/B66AA (E)	146	Miscellaneous [NA 507-1] (E)	138
AIR -32 B2A/B66AA (E)	146	Platform Mount [LP 303-1] (E)	138
APX16DWV-16DWVS-E-A20 (P)	146	VHLP2-11 (E)	138
APX16DWV-16DWVS-E-A20 (P)	146	VHLP2-11 (E)	138
APX16DWV-16DWVS-E-A20 (P)	146	Side Arm Mount [SO 102-1] (E)	122
APXVAARR24_43-U-NA20 (P)	146	TMA-DB-T1-6Z-8AB-0Z (E)	122
APXVAARR24_43-U-NA20 (P)	146	6' x 2" Mount Pipe (E)	122
APXVAARR24_43-U-NA20 (P)	146	BXA-80063/6CF w/ Mount Pipe (E)	120
(3) RADIO 4449 B12/B71 (P)	146	MG D3-800TV w/ Mount Pipe (E)	120
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	146	MG D3-800TV w/ Mount Pipe (E)	120
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	146	MG D3-800TV w/ Mount Pipe (E)	120
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	146	LNX-6514DS-A1M w/ Mount Pipe (E)	120
Platform Mount [LP 303-1] (RMQP-496)	146	LNX-6514DS-A1M w/ Mount Pipe (E)	120
		LNX-6514DS-A1M w/ Mount Pipe (E)	120
AIR -32 B2A/B66AA (E)	146	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (E)	120
LLPX310R-V1 w/ Mount Pipe (E)	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (E)	120
LLPX310R-V1 w/ Mount Pipe (E)	138		
LLPX310R-V1 w/ Mount Pipe (E)	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe (E)	120
FPA5150-23PM-1 w/ Mount Pipe (E)	138		
FDD_R6_RRH (E)	138	GPS_A (E)	120
FDD_R6_RRH (E)	138	RRH2X40-AWS (E)	120
FDD_R6_RRH (E)	138	RRH2X40-AWS (E)	120
(6) ACU-A20-N (E)	138	RRH2X40-AWS (E)	120
(6) ACU-A20-N (E)	138	FD9R6004/2C-3L (E)	120
(6) ACU-A20-N (E)	138	FD9R6004/2C-3L (E)	120
DT465B-2XR w/ Mount Pipe (R)	138	5' x 2" Pipe Mount (E)	120
DT465B-2XR w/ Mount Pipe (R)	138	5' x 2" Pipe Mount (E)	120
DT465B-2XR w/ Mount Pipe (R)	138	5' x 2" Pipe Mount (E)	120
RRH2X50-800 (R)	138	Platform Mount [LP 1201-1] (E)	120
RRH2X50-800 (R)	138	BXA-80063/4CF w/ Mount Pipe (E)	120
RRH2X50-800 (R)	138	BXA-80063/4CF w/ Mount Pipe (E)	120
TD-RRH8X20-25 (R)	138	KS24019-L112A (E)	90
TD-RRH8X20-25 (R)	138	Side Arm Mount [SO 701-1] (E)	90
TD-RRH8X20-25 (R)	138		
6' x 2" Mount Pipe (E-DISHES)	138		

M□□□R□□□□R□□□□

□R□D□	□□	□□	□R□D□	□□	□□
A500-50	50 ksi	62 ksi	A607-60	60 ksi	75 ksi

□□ □R□D□□□□□□□□□□

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 65.4%

B+T Group
1717 S.Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***82071.003.01 - Hillside, CT (BU# 876323)***		
Project:			
Client: Crown Castle	Drawn by: Suhas Poojary		App'd:
Code: TIA-222-H	Date: 10/03/18		Scale: NTS
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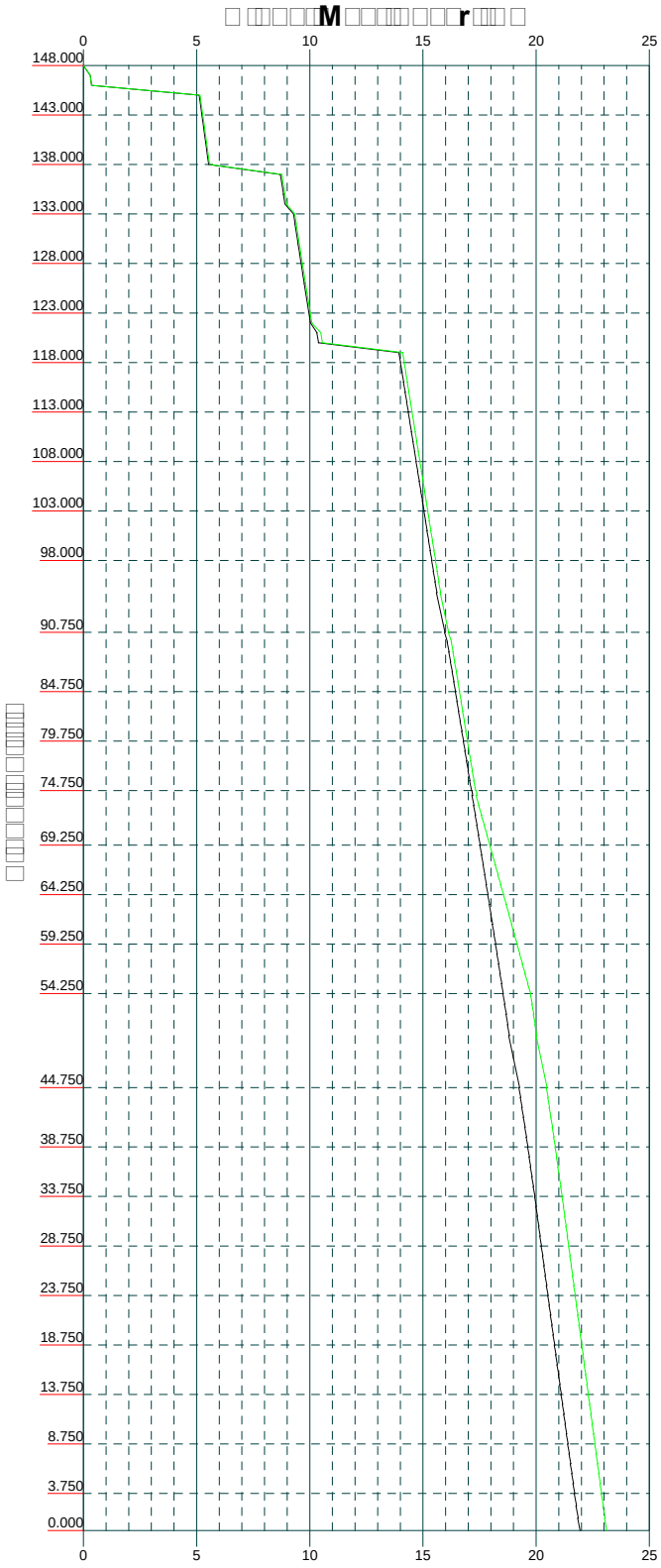
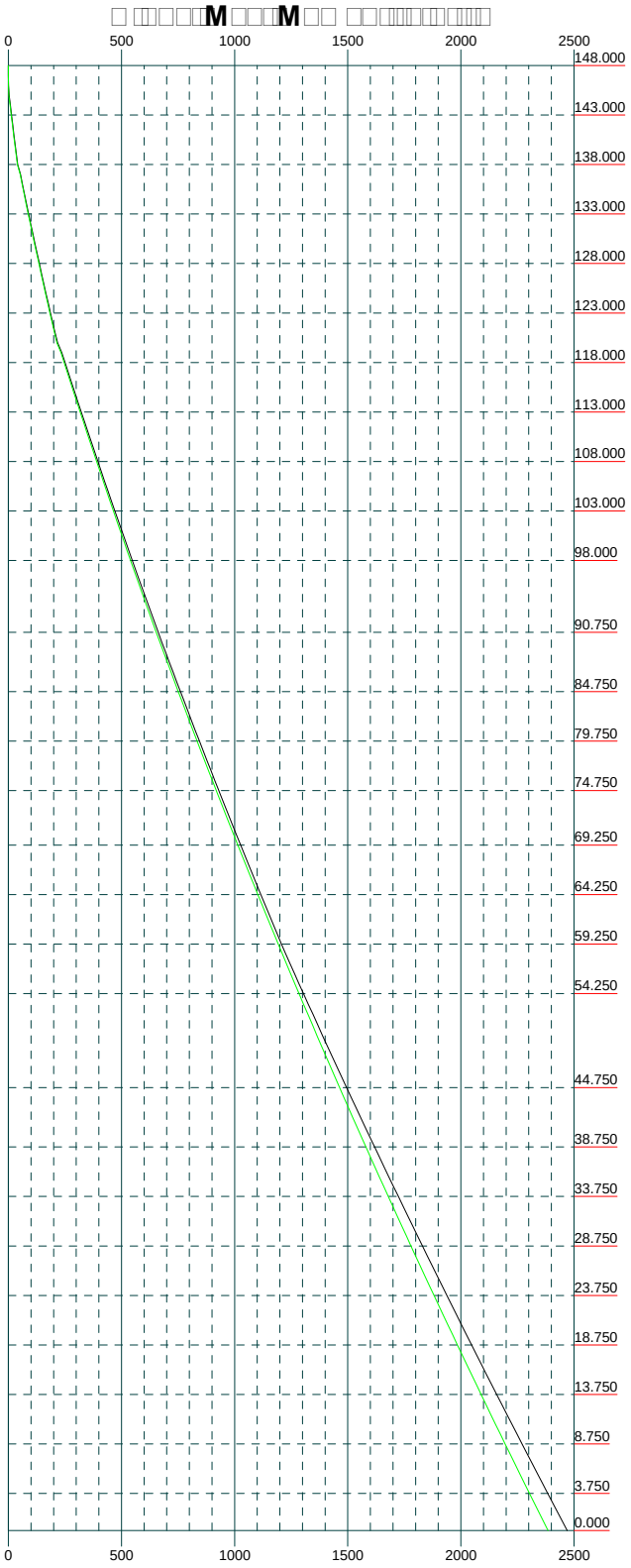
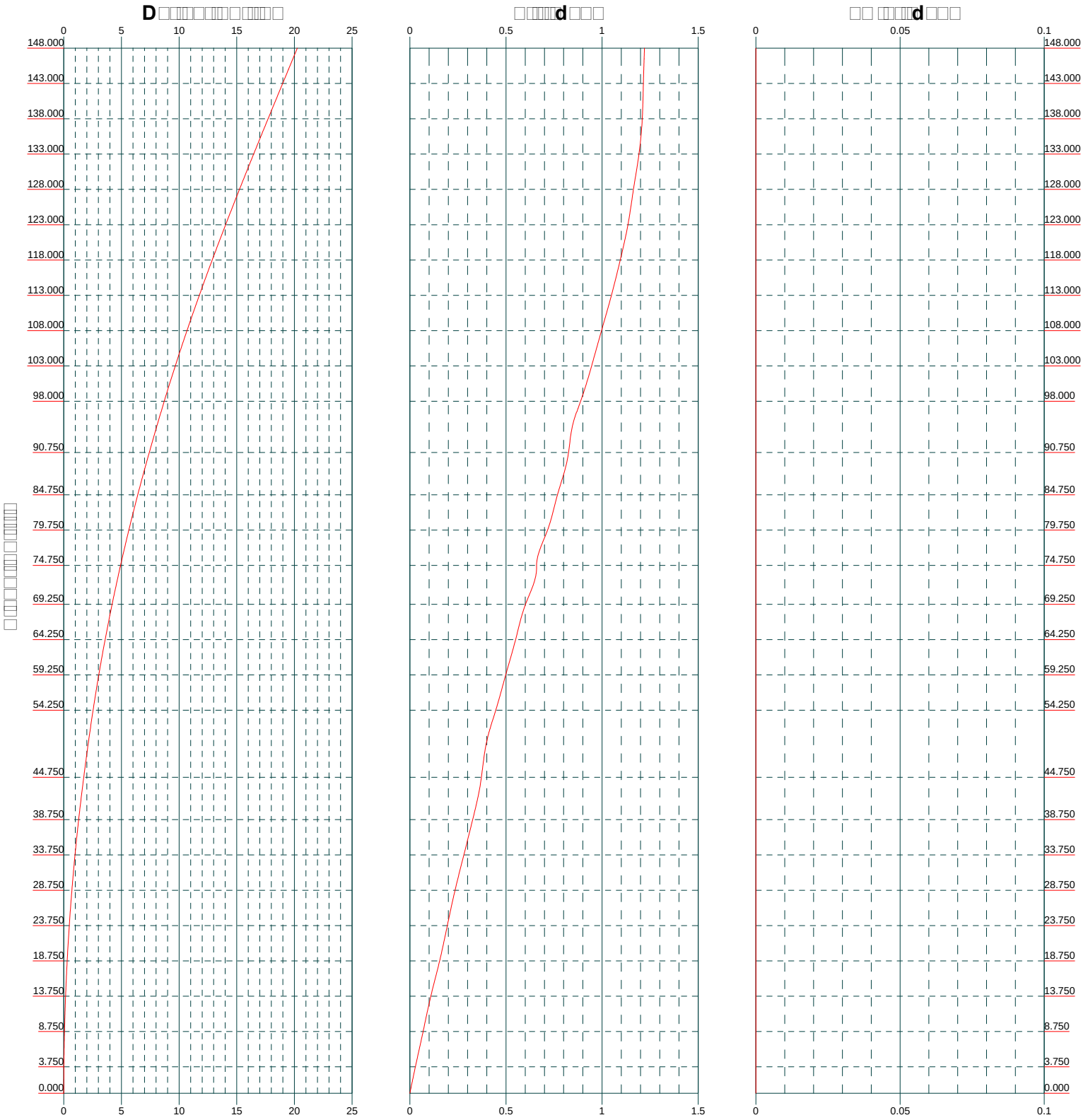


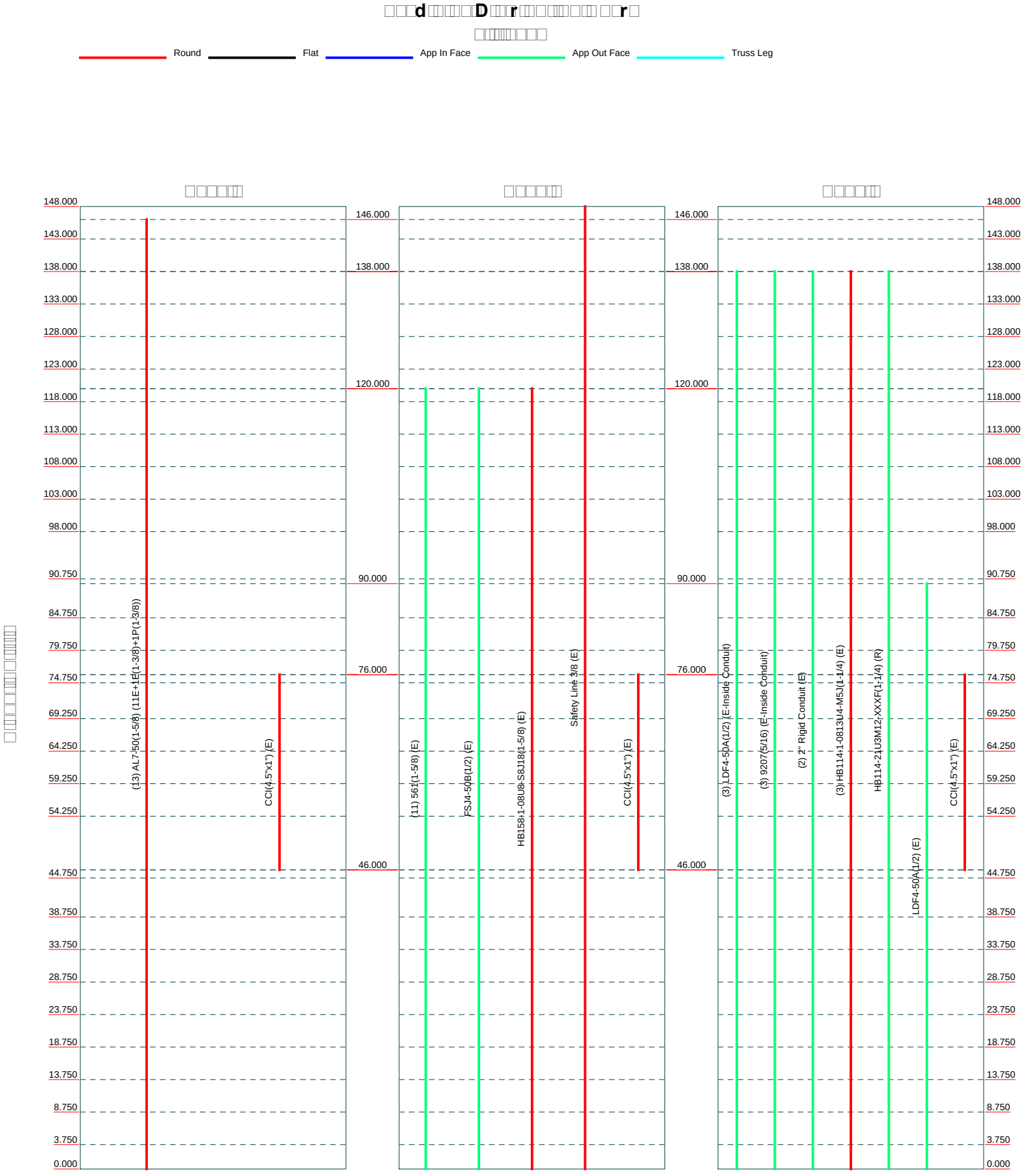


B+T Group 1717 S.Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: ***82071.003.01 - Hillside, CT (BU# 876323)***		
	Project:		
	Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Code: TIA-222-H	Date: 10/03/18	Scale: NTS
	Path: C:\Users\SHIVA\Desktop\jobs\03-10-2018\Compile_82071_876323_Hillside-----Suhas-----Anand---Qcd\Tnx_003_01\Modified\eri		Dwg No. E-4



B+T Group
1717 S.Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 82071.003.01 - Hillside, CT (BU# 876323)			
Project:			
Client: Crown Castle	Drawn by: Suhas Poojary	App'd:	
Code: TIA-222-H	Date: 10/03/18	Scale: NTS	
Path: C:\Users\SHIVA\Desktop\jobs\03-10-2018\Compile_82071_876323_Hillside-----Suhas----Anand---Qcd\Tnx_003_01\Modified\eri		Dwg No. E-5	



B+T Group 1717 S.Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: ***82071.003.01 - Hillside, CT (BU# 876323)***		
	Project:		
	Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Code: TIA-222-H	Date: 10/03/18	Scale: NTS
	Path: C:\Users\SHIVA\Desktop\jobs\03-10-2018\Compile_82071_876323_Hillside-----Suhas-----Anand---Qcd\Tnx_003_01\Modified\eri		Dwg No. E-7

General Information

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

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 157.000 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height 0.000 ft.
Nominal ice thickness of 1.275 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TOWER RATING: 65.4%.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.000-143.000	5.000	0.000	Round	24.000	24.000	0.250		A500-50 (50 ksi)
L2	143.000-138.000	5.000	0.000	Round	24.000	24.000	0.250		A500-50 (50 ksi)
L3	138.000-133.000	5.000	0.000	18	22.000	23.050	0.250	1.000	A607-60 (60 ksi)
L4	133.000-128.000	5.000	0.000	18	23.050	24.100	0.250	1.000	A607-60 (60 ksi)
L5	128.000-123.000	5.000	0.000	18	24.100	25.150	0.250	1.000	A607-60 (60 ksi)
L6	123.000-118.000	5.000	0.000	18	25.150	26.201	0.250	1.000	A607-60 (60 ksi)
L7	118.000-113.000	5.000	0.000	18	26.201	27.251	0.250	1.000	A607-60 (60 ksi)
L8	113.000-108.000	5.000	0.000	18	27.251	28.301	0.250	1.000	A607-60 (60 ksi)
L9	108.000-103.000	5.000	0.000	18	28.301	29.351	0.250	1.000	A607-60 (60 ksi)
L10	103.000-98.000	5.000	0.000	18	29.351	30.401	0.250	1.000	A607-60 (60 ksi)
L11	98.000-90.750	7.250	4.000	18	30.401	31.924	0.250	1.000	A607-60 (60 ksi)
L12	90.750-89.750	5.000	0.000	18	30.584	31.634	0.313	1.250	A607-60 (60 ksi)
L13	89.750-84.750	5.000	0.000	18	31.634	32.684	0.313	1.250	A607-60 (60 ksi)
L14	84.750-79.750	5.000	0.000	18	32.684	33.735	0.313	1.250	A607-60 (60 ksi)
L15	79.750-74.750	5.000	0.000	18	33.735	34.785	0.313	1.250	A607-60 (60 ksi)
L16	74.750-74.500	0.250	0.000	18	34.785	34.837	0.313	1.250	A607-60 (60 ksi)
L17	74.500-74.250	0.250	0.000	18	34.837	34.890	0.313	1.250	A607-60 (60 ksi)
L18	74.250-69.250	5.000	0.000	18	34.890	35.940	0.313	1.250	A607-60 (60 ksi)
L19	69.250-64.250	5.000	0.000	18	35.940	36.990	0.313	1.250	A607-60 (60 ksi)
L20	64.250-59.250	5.000	0.000	18	36.990	38.040	0.313	1.250	A607-60 (60 ksi)
L21	59.250-54.250	5.000	0.000	18	38.040	39.091	0.313	1.250	A607-60 (60 ksi)
L22	54.250-44.750	9.500	5.250	18	39.091	41.086	0.313	1.250	A607-60 (60 ksi)
L23	44.750-43.750	6.250	0.000	18	39.358	40.671	0.375	1.500	A607-60 (60 ksi)
L24	43.750-38.750	5.000	0.000	18	40.671	41.721	0.375	1.500	A607-60 (60 ksi)
L25	38.750-33.750	5.000	0.000	18	41.721	42.771	0.375	1.500	A607-60 (60 ksi)
L26	33.750-28.750	5.000	0.000	18	42.771	43.822	0.375	1.500	A607-60 (60 ksi)
L27	28.750-23.750	5.000	0.000	18	43.822	44.872	0.375	1.500	A607-60 (60 ksi)
L28	23.750-18.750	5.000	0.000	18	44.872	45.922	0.375	1.500	A607-60 (60 ksi)
L29	18.750-13.750	5.000	0.000	18	45.922	46.972	0.375	1.500	A607-60 (60 ksi)
L30	13.750-8.750	5.000	0.000	18	46.972	48.022	0.375	1.500	A607-60 (60 ksi)
L31	8.750-3.750	5.000	0.000	18	48.022	49.072	0.375	1.500	A607-60

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L32	3.750-0.000	3.750		18	49.072	49.860	0.375	1.500	(60 ksi) A607-60 (60 ksi)

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Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.000	18.653	1315.343	8.397	12.000	109.612	2630.685	9.321	0.000	0
	24.000	18.653	1315.343	8.397	12.000	109.612	2630.685	9.321	0.000	0
L2	24.000	18.653	1315.343	8.397	12.000	109.612	2630.685	9.321	0.000	0
	24.000	18.653	1315.343	8.397	12.000	109.612	2630.685	9.321	0.000	0
L3	22.301	17.259	1031.483	7.721	11.176	92.294	2064.324	8.631	3.432	13.728
	23.367	18.092	1188.223	8.094	11.709	101.475	2378.010	9.048	3.617	14.467
L4	23.367	18.092	1188.223	8.094	11.709	101.475	2378.010	9.048	3.617	14.467
	24.434	18.925	1360.087	8.467	12.243	111.091	2721.965	9.464	3.802	15.207
L5	24.434	18.925	1360.087	8.467	12.243	111.091	2721.965	9.464	3.802	15.207
	25.500	19.759	1547.773	8.840	12.776	121.143	3097.583	9.881	3.986	15.946
L6	25.500	19.759	1547.773	8.840	12.776	121.143	3097.583	9.881	3.986	15.946
	26.566	20.592	1751.977	9.212	13.310	131.629	3506.259	10.298	4.171	16.685
L7	26.566	20.592	1751.977	9.212	13.310	131.629	3506.259	10.298	4.171	16.685
	27.633	21.425	1973.395	9.585	13.843	142.551	3949.386	10.715	4.356	17.425
L8	27.633	21.425	1973.395	9.585	13.843	142.551	3949.386	10.715	4.356	17.425
	28.699	22.258	2212.724	9.958	14.377	153.908	4428.359	11.131	4.541	18.164
L9	28.699	22.258	2212.724	9.958	14.377	153.908	4428.359	11.131	4.541	18.164
	29.765	23.092	2470.661	10.331	14.910	165.701	4944.572	11.548	4.726	18.903
L10	29.765	23.092	2470.661	10.331	14.910	165.701	4944.572	11.548	4.726	18.903
	30.832	23.925	2747.902	10.704	15.444	177.929	5499.419	11.965	4.911	19.642
L11	30.832	23.925	2747.902	10.704	15.444	177.929	5499.419	11.965	4.911	19.642
	32.378	25.133	3185.614	11.244	16.217	196.432	6375.419	12.569	5.179	20.714
L12	31.861	30.025	3476.088	10.746	15.537	223.735	6956.750	15.016	4.833	15.465
	32.074	31.067	3850.575	11.119	16.070	239.611	7706.217	15.537	5.018	16.056
L13	32.074	31.067	3850.575	11.119	16.070	239.611	7706.217	15.537	5.018	16.056
	33.140	32.109	4251.037	11.492	16.604	256.031	8507.667	16.057	5.202	16.648
L14	33.140	32.109	4251.037	11.492	16.604	256.031	8507.667	16.057	5.202	16.648
	34.207	33.150	4678.344	11.865	17.137	272.995	9362.843	16.578	5.387	17.239
L15	34.207	33.150	4678.344	11.865	17.137	272.995	9362.843	16.578	5.387	17.239
	35.273	34.192	5133.367	12.238	17.671	290.503	10273.488	17.099	5.572	17.831
L16	35.273	34.192	5133.367	12.238	17.671	290.503	10273.488	17.099	5.572	17.831
	35.326	34.244	5156.861	12.256	17.697	291.392	10320.507	17.125	5.581	17.86
L17	35.326	34.244	5156.861	12.256	17.697	291.392	10320.507	17.125	5.581	17.86
	35.380	34.296	5180.427	12.275	17.724	292.283	10367.670	17.151	5.591	17.89
L18	35.380	34.296	5180.427	12.275	17.724	292.283	10367.670	17.151	5.591	17.89
	36.446	35.338	5666.944	12.648	18.257	310.390	11341.344	17.672	5.775	18.481
L19	36.446	35.338	5666.944	12.648	18.257	310.390	11341.344	17.672	5.775	18.481
	37.513	36.380	6183.005	13.021	18.791	329.041	12374.146	18.193	5.960	19.073
L20	37.513	36.380	6183.005	13.021	18.791	329.041	12374.146	18.193	5.960	19.073
	38.579	37.421	6729.483	13.393	19.325	348.236	13467.821	18.714	6.145	19.664
L21	38.579	37.421	6729.483	13.393	19.325	348.236	13467.821	18.714	6.145	19.664
	39.645	38.463	7307.248	13.766	19.858	367.975	14624.111	19.235	6.330	20.256
L22	39.645	38.463	7307.248	13.766	19.858	367.975	14624.111	19.235	6.330	20.256
	41.672	40.442	8494.315	14.475	20.872	406.978	16999.807	20.225	6.681	21.38
L23	41.027	46.400	8908.625	13.839	19.994	445.565	17828.972	23.204	6.267	16.712
	41.241	47.962	9839.232	14.305	20.661	476.226	19691.410	23.986	6.498	17.328
L24	41.241	47.962	9839.232	14.305	20.661	476.226	19691.410	23.986	6.498	17.328
	42.307	49.212	10628.728	14.678	21.194	501.489	21271.442	24.611	6.683	17.821

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L25	42.307	49.212	10628.728	14.678	21.194	501.489	21271.442	24.611	6.683	17.821
	43.373	50.462	11459.367	15.051	21.728	527.405	22933.814	25.236	6.868	18.314
L26	43.373	50.462	11459.367	15.051	21.728	527.405	22933.814	25.236	6.868	18.314
	44.440	51.712	12332.193	15.424	22.261	553.974	24680.612	25.861	7.053	18.807
L27	44.440	51.712	12332.193	15.424	22.261	553.974	24680.612	25.861	7.053	18.807
	45.506	52.962	13248.249	15.796	22.795	581.196	26513.931	26.486	7.237	19.3
L28	45.506	52.962	13248.249	15.796	22.795	581.196	26513.931	26.486	7.237	19.3
	46.572	54.212	14208.584	16.169	23.328	609.071	28435.864	27.111	7.422	19.793
L29	46.572	54.212	14208.584	16.169	23.328	609.071	28435.864	27.111	7.422	19.793
	47.639	55.462	15214.239	16.542	23.862	637.598	30448.498	27.736	7.607	20.286
L30	47.639	55.462	15214.239	16.542	23.862	637.598	30448.498	27.736	7.607	20.286
	48.705	56.712	16266.261	16.915	24.395	666.779	32553.926	28.361	7.792	20.778
L31	48.705	56.712	16266.261	16.915	24.395	666.779	32553.926	28.361	7.792	20.778
	49.772	57.962	17365.696	17.288	24.929	696.613	34754.242	28.987	7.977	21.271
L32	49.772	57.962	17365.696	17.288	24.929	696.613	34754.242	28.987	7.977	21.271
	50.571	58.900	18222.014	17.567	25.329	719.416	36468.004	29.455	8.115	21.641

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 148.000-143.000				1	1	1			
L2 143.000-138.000				1	1	1			
L3 138.000-133.000				1	1	1			
L4 133.000-128.000				1	1	1			
L5 128.000-123.000				1	1	1			
L6 123.000-118.000				1	1	1			
L7 118.000-113.000				1	1	1			
L8 113.000-108.000				1	1	1			
L9 108.000-103.000				1	1	1			
L10 103.000-98.000				1	1	1			
L11 98.000-90.750				1	1	1			
L12 90.750-89.750				1	1	1			
L13 89.750-84.750				1	1	1			
L14 84.750-79.750				1	1	1			
L15				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
79.750-74.750 L16				1	1	1			
74.750-74.500 L17				1	1	1			
74.500-74.250 L18				1	1	1			
74.250-69.250 L19				1	1	1			
69.250-64.250 L20				1	1	1			
64.250-59.250 L21				1	1	1			
59.250-54.250 L22				1	1	1			
54.250-44.750 L23				1	1	1			
44.750-43.750 L24				1	1	1			
43.750-38.750 L25				1	1	1			
38.750-33.750 L26				1	1	1			
33.750-28.750 L27				1	1	1			
28.750-23.750 L28				1	1	1			
23.750-18.750 L29				1	1	1			
18.750-13.750 L30				1	1	1			
13.750-8.750 L31				1	1	1			
8.750-3.750 L32				1	1	1			
3.750-0.000									

□□□d□□□□□□□□r□□ □□□r□□□□□□□□□□□□r□d□□ □R□□□d□□r□□□□

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
AL7-50(1-5/8) (11E+1E(1-3/8)+1P(1-3/8))	A	No	Surface Ar (CaAa)	146.000 - 0.000	13	7	-0.500 -0.270	1.960		0.001
HB114-1-0813U4-M5J(1-1/4) (E)	C	No	Surface Ar (CaAa)	138.000 - 0.000	3	3	0.100 0.200	1.540		0.001
HB158-1-08U8-S8J18(1-5/8) (E) *$$$*	B	No	Surface Ar (CaAa)	120.000 - 0.000	1	1	-0.150 -0.120	1.980		0.001
Safety Line 3/8 (E) ***	B	No	Surface Ar (CaAa)	148.000 - 0.000	1	1	-0.500 -0.490	0.375		0.000

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
CCI(4.5"x1") (E)	A	No	Surface Af (CaAa)	76.000 - 46.000	1	1	0.000 0.050	4.500	11.000	0.000
CCI(4.5"x1") (E)	C	No	Surface Af (CaAa)	76.000 - 46.000	1	1	0.000 0.050	4.500	11.000	0.000
CCI(4.5"x1") (E) ***	B	No	Surface Af (CaAa)	76.000 - 46.000	1	1	0.000 0.050	4.500	11.000	0.000

[illegible]

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
$$$									
LDF4-50A(1/2) (E-Inside Conduit)	C	No	No	Inside Pole	138.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
9207(5/16) (E-Inside Conduit)	C	No	No	Inside Pole	138.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
2" Rigid Conduit (E)	C	No	No	Inside Pole	138.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.003 0.003 0.003 0.003
HB114-21U3M12-X XXF(1-1/4) (R)	C	No	No	Inside Pole	138.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
$$$									
561(1-5/8) (E)	B	No	No	Inside Pole	120.000 - 0.000	11	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001
FSJ4-50B(1/2) (E)	B	No	No	Inside Pole	120.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
$$$									
LDF4-50A(1/2) (E)	C	No	No	Inside Pole	90.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000
***									

[illegible]

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.000-143.000	A	0.000	0.000	4.116	0.000	0.020
		B	0.000	0.000	0.188	0.000	0.001
		C	0.000	0.000	0.000	0.000	0.000
L2	143.000-138.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	0.188	0.000	0.001
		C	0.000	0.000	0.000	0.000	0.000
L3	138.000-133.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	0.188	0.000	0.001
		C	0.000	0.000	2.310	0.000	0.063
L4	133.000-128.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	0.188	0.000	0.001
		C	0.000	0.000	2.310	0.000	0.063
L5	128.000-123.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	0.188	0.000	0.001
		C	0.000	0.000	2.310	0.000	0.063
L6	123.000-118.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	0.584	0.000	0.034
		C	0.000	0.000	2.310	0.000	0.063
L7	118.000-113.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.063
L8	113.000-108.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.063
L9	108.000-103.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.063
L10	103.000-98.000	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.063
L11	98.000-90.750	A	0.000	0.000	9.947	0.000	0.049
		B	0.000	0.000	1.707	0.000	0.120
		C	0.000	0.000	3.349	0.000	0.092
L12	90.750-89.750	A	0.000	0.000	1.372	0.000	0.007
		B	0.000	0.000	0.235	0.000	0.017
		C	0.000	0.000	0.462	0.000	0.013
L13	89.750-84.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L14	84.750-79.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L15	79.750-74.750	A	0.000	0.000	7.797	0.000	0.034
		B	0.000	0.000	2.115	0.000	0.083
		C	0.000	0.000	3.248	0.000	0.064
L16	74.750-74.500	A	0.000	0.000	0.530	0.000	0.002
		B	0.000	0.000	0.246	0.000	0.004
		C	0.000	0.000	0.303	0.000	0.003
L17	74.500-74.250	A	0.000	0.000	0.530	0.000	0.002
		B	0.000	0.000	0.246	0.000	0.004
		C	0.000	0.000	0.303	0.000	0.003
L18	74.250-69.250	A	0.000	0.000	10.610	0.000	0.034
		B	0.000	0.000	4.928	0.000	0.083
		C	0.000	0.000	6.060	0.000	0.064
L19	69.250-64.250	A	0.000	0.000	10.610	0.000	0.034
		B	0.000	0.000	4.928	0.000	0.083
		C	0.000	0.000	6.060	0.000	0.064
L20	64.250-59.250	A	0.000	0.000	10.610	0.000	0.034
		B	0.000	0.000	4.928	0.000	0.083
		C	0.000	0.000	6.060	0.000	0.064
L21	59.250-54.250	A	0.000	0.000	10.610	0.000	0.034

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	4.928	0.000	0.083
		C	0.000	0.000	6.060	0.000	0.064
L22	54.250-44.750	A	0.000	0.000	19.221	0.000	0.064
		B	0.000	0.000	8.425	0.000	0.157
		C	0.000	0.000	10.576	0.000	0.122
L23	44.750-43.750	A	0.000	0.000	1.372	0.000	0.007
		B	0.000	0.000	0.235	0.000	0.017
		C	0.000	0.000	0.462	0.000	0.013
L24	43.750-38.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L25	38.750-33.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L26	33.750-28.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L27	28.750-23.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L28	23.750-18.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L29	18.750-13.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L30	13.750-8.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L31	8.750-3.750	A	0.000	0.000	6.860	0.000	0.034
		B	0.000	0.000	1.178	0.000	0.083
		C	0.000	0.000	2.310	0.000	0.064
L32	3.750-0.000	A	0.000	0.000	5.145	0.000	0.025
		B	0.000	0.000	0.883	0.000	0.062
		C	0.000	0.000	1.732	0.000	0.048

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.000-143.000	A	1.479	0.000	0.000	6.254	0.000	0.096
		B		0.000	0.000	1.666	0.000	0.018
		C		0.000	0.000	0.000	0.000	0.000
L2	143.000-138.000	A	1.474	0.000	0.000	10.417	0.000	0.160
		B		0.000	0.000	1.661	0.000	0.018
		C		0.000	0.000	0.000	0.000	0.000
L3	138.000-133.000	A	1.468	0.000	0.000	10.411	0.000	0.160
		B		0.000	0.000	1.656	0.000	0.018
		C		0.000	0.000	4.723	0.000	0.110
L4	133.000-128.000	A	1.463	0.000	0.000	10.404	0.000	0.159
		B		0.000	0.000	1.650	0.000	0.018
		C		0.000	0.000	4.716	0.000	0.110
L5	128.000-123.000	A	1.457	0.000	0.000	10.396	0.000	0.159
		B		0.000	0.000	1.645	0.000	0.017
		C		0.000	0.000	4.709	0.000	0.109
L6	123.000-118.000	A	1.451	0.000	0.000	10.389	0.000	0.158
		B		0.000	0.000	2.615	0.000	0.062

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	4.702	0.000	0.109
L7	118.000-113.000	A	1.445	0.000	0.000	10.381	0.000	0.158
		B		0.000	0.000	4.068	0.000	0.129
		C		0.000	0.000	4.694	0.000	0.109
L8	113.000-108.000	A	1.439	0.000	0.000	10.373	0.000	0.157
		B		0.000	0.000	4.055	0.000	0.129
		C		0.000	0.000	4.686	0.000	0.109
L9	108.000-103.000	A	1.432	0.000	0.000	10.365	0.000	0.157
		B		0.000	0.000	4.042	0.000	0.128
		C		0.000	0.000	4.678	0.000	0.108
L10	103.000-98.000	A	1.425	0.000	0.000	10.356	0.000	0.156
		B		0.000	0.000	4.028	0.000	0.128
		C		0.000	0.000	4.669	0.000	0.108
L11	98.000-90.750	A	1.416	0.000	0.000	15.001	0.000	0.225
		B		0.000	0.000	5.814	0.000	0.185
		C		0.000	0.000	6.754	0.000	0.156
L12	90.750-89.750	A	1.410	0.000	0.000	2.069	0.000	0.031
		B		0.000	0.000	0.802	0.000	0.025
		C		0.000	0.000	0.932	0.000	0.022
L13	89.750-84.750	A	1.405	0.000	0.000	10.331	0.000	0.155
		B		0.000	0.000	3.988	0.000	0.127
		C		0.000	0.000	4.644	0.000	0.108
L14	84.750-79.750	A	1.397	0.000	0.000	10.321	0.000	0.154
		B		0.000	0.000	3.971	0.000	0.126
		C		0.000	0.000	4.634	0.000	0.108
L15	79.750-74.750	A	1.388	0.000	0.000	11.595	0.000	0.164
		B		0.000	0.000	5.238	0.000	0.137
		C		0.000	0.000	5.907	0.000	0.119
L16	74.750-74.500	A	1.383	0.000	0.000	0.772	0.000	0.010
		B		0.000	0.000	0.454	0.000	0.008
		C		0.000	0.000	0.488	0.000	0.008
L17	74.500-74.250	A	1.383	0.000	0.000	0.772	0.000	0.010
		B		0.000	0.000	0.454	0.000	0.008
		C		0.000	0.000	0.487	0.000	0.008
L18	74.250-69.250	A	1.378	0.000	0.000	15.425	0.000	0.196
		B		0.000	0.000	9.061	0.000	0.169
		C		0.000	0.000	9.738	0.000	0.151
L19	69.250-64.250	A	1.368	0.000	0.000	15.403	0.000	0.195
		B		0.000	0.000	9.032	0.000	0.168
		C		0.000	0.000	9.716	0.000	0.150
L20	64.250-59.250	A	1.357	0.000	0.000	15.379	0.000	0.193
		B		0.000	0.000	9.000	0.000	0.167
		C		0.000	0.000	9.692	0.000	0.149
L21	59.250-54.250	A	1.346	0.000	0.000	15.354	0.000	0.192
		B		0.000	0.000	8.966	0.000	0.166
		C		0.000	0.000	9.666	0.000	0.148
L22	54.250-44.750	A	1.328	0.000	0.000	27.824	0.000	0.350
		B		0.000	0.000	15.660	0.000	0.302
		C		0.000	0.000	17.018	0.000	0.268
L23	44.750-43.750	A	1.313	0.000	0.000	2.047	0.000	0.030
		B		0.000	0.000	0.767	0.000	0.025
		C		0.000	0.000	0.909	0.000	0.021
L24	43.750-38.750	A	1.304	0.000	0.000	10.205	0.000	0.146
		B		0.000	0.000	3.785	0.000	0.122
		C		0.000	0.000	4.517	0.000	0.104
L25	38.750-33.750	A	1.287	0.000	0.000	10.184	0.000	0.145
		B		0.000	0.000	3.751	0.000	0.121
		C		0.000	0.000	4.496	0.000	0.104
L26	33.750-28.750	A	1.268	0.000	0.000	10.160	0.000	0.144
		B		0.000	0.000	3.714	0.000	0.120
		C		0.000	0.000	4.473	0.000	0.103

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L27	28.750-23.750	A	1.246	0.000	0.000	10.133	0.000	0.142
		B		0.000	0.000	3.670	0.000	0.119
		C		0.000	0.000	4.445	0.000	0.102
L28	23.750-18.750	A	1.220	0.000	0.000	10.100	0.000	0.140
		B		0.000	0.000	3.618	0.000	0.118
		C		0.000	0.000	4.413	0.000	0.101
L29	18.750-13.750	A	1.188	0.000	0.000	10.060	0.000	0.137
		B		0.000	0.000	3.553	0.000	0.117
		C		0.000	0.000	4.372	0.000	0.100
L30	13.750-8.750	A	1.145	0.000	0.000	10.006	0.000	0.134
		B		0.000	0.000	3.467	0.000	0.115
		C		0.000	0.000	4.319	0.000	0.099
L31	8.750-3.750	A	1.079	0.000	0.000	9.924	0.000	0.129
		B		0.000	0.000	3.336	0.000	0.112
		C		0.000	0.000	4.237	0.000	0.096
L32	3.750-0.000	A	0.957	0.000	0.000	7.328	0.000	0.090
		B		0.000	0.000	2.318	0.000	0.081
		C		0.000	0.000	3.063	0.000	0.069

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Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.000-143.000	-5.353	1.334	-3.598	0.174
L2	143.000-138.000	-7.046	1.873	-4.872	0.710
L3	138.000-133.000	-5.868	3.042	-4.209	2.068
L4	133.000-128.000	-5.984	3.107	-4.314	2.122
L5	128.000-123.000	-6.096	3.169	-4.417	2.175
L6	123.000-118.000	-5.848	2.930	-4.152	1.909
L7	118.000-113.000	-5.442	2.559	-3.727	1.505
L8	113.000-108.000	-5.532	2.605	-3.806	1.539
L9	108.000-103.000	-5.620	2.648	-3.884	1.573
L10	103.000-98.000	-5.704	2.690	-3.960	1.605
L11	98.000-90.750	-5.804	2.740	-4.050	1.644
L12	90.750-89.750	-5.832	2.755	-4.075	1.655
L13	89.750-84.750	-5.879	2.778	-4.120	1.676
L14	84.750-79.750	-5.955	2.816	-4.191	1.707
L15	79.750-74.750	-5.314	2.515	-3.912	1.595
L16	74.750-74.500	-3.956	1.873	-3.173	1.295
L17	74.500-74.250	-3.959	1.874	-3.176	1.296
L18	74.250-69.250	-3.994	1.892	-3.208	1.310
L19	69.250-64.250	-4.061	1.924	-3.267	1.336
L20	64.250-59.250	-4.126	1.956	-3.325	1.362
L21	59.250-54.250	-4.190	1.988	-3.383	1.388
L22	54.250-44.750	-4.475	2.125	-3.583	1.474
L23	44.750-43.750	-6.428	3.053	-4.645	1.911
L24	43.750-38.750	-6.464	3.071	-4.687	1.935
L25	38.750-33.750	-6.523	3.100	-4.748	1.965
L26	33.750-28.750	-6.580	3.129	-4.808	1.995
L27	28.750-23.750	-6.636	3.157	-4.868	2.026
L28	23.750-18.750	-6.690	3.184	-4.928	2.058
L29	18.750-13.750	-6.743	3.210	-4.989	2.093
L30	13.750-8.750	-6.795	3.236	-5.052	2.131
L31	8.750-3.750	-6.845	3.261	-5.122	2.180
L32	3.750-0.000	-6.887	3.283	-5.207	2.253

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

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	AL7-50(1-5/8)	143.00 - 146.00	1.0000	1.0000
L1	20	Safety Line 3/8	143.00 - 148.00	1.0000	1.0000
L2	2	AL7-50(1-5/8)	138.00 - 143.00	1.0000	1.0000
L2	20	Safety Line 3/8	138.00 - 143.00	1.0000	1.0000
L3	2	AL7-50(1-5/8)	133.00 - 138.00	1.0000	1.0000
L3	11	HB114-1-0813U4-M5J(1-1/4)	133.00 - 138.00	1.0000	1.0000
L3	20	Safety Line 3/8	133.00 - 138.00	1.0000	1.0000
L4	2	AL7-50(1-5/8)	128.00 - 133.00	1.0000	1.0000
L4	11	HB114-1-0813U4-M5J(1-1/4)	128.00 - 133.00	1.0000	1.0000
L4	20	Safety Line 3/8	128.00 - 133.00	1.0000	1.0000
L5	2	AL7-50(1-5/8)	123.00 - 128.00	1.0000	1.0000
L5	11	HB114-1-0813U4-M5J(1-1/4)	123.00 - 128.00	1.0000	1.0000
L5	20	Safety Line 3/8	123.00 - 128.00	1.0000	1.0000
L6	2	AL7-50(1-5/8)	118.00 - 123.00	1.0000	1.0000
L6	11	HB114-1-0813U4-M5J(1-1/4)	118.00 - 123.00	1.0000	1.0000
L6	16	HB158-1-08U8-S8J18(1-5/8)	118.00 - 120.00	1.0000	1.0000
L6	20	Safety Line 3/8	118.00 - 123.00	1.0000	1.0000
L7	2	AL7-50(1-5/8)	113.00 - 118.00	1.0000	1.0000
L7	11	HB114-1-0813U4-M5J(1-1/4)	113.00 - 118.00	1.0000	1.0000
L7	16	HB158-1-08U8-S8J18(1-5/8)	113.00 - 118.00	1.0000	1.0000
L7	20	Safety Line 3/8	113.00 - 118.00	1.0000	1.0000
L8	2	AL7-50(1-5/8)	108.00 - 113.00	1.0000	1.0000
L8	11	HB114-1-0813U4-M5J(1-1/4)	108.00 - 113.00	1.0000	1.0000
L8	16	HB158-1-08U8-S8J18(1-5/8)	108.00 - 113.00	1.0000	1.0000
L8	20	Safety Line 3/8	108.00 - 113.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L9	2	AL7-50(1-5/8)	103.00 - 108.00	1.0000	1.0000
L9	11	HB114-1-0813U4-M5J(1-1/4)	103.00 - 108.00	1.0000	1.0000
L9	16	HB158-1-08U8-S8J18(1-5/8)	103.00 - 108.00	1.0000	1.0000
L9	20	Safety Line 3/8	103.00 - 108.00	1.0000	1.0000
L10	2	AL7-50(1-5/8)	98.00 - 103.00	1.0000	1.0000
L10	11	HB114-1-0813U4-M5J(1-1/4)	98.00 - 103.00	1.0000	1.0000
L10	16	HB158-1-08U8-S8J18(1-5/8)	98.00 - 103.00	1.0000	1.0000
L10	20	Safety Line 3/8	98.00 - 103.00	1.0000	1.0000
L11	2	AL7-50(1-5/8)	90.75 - 98.00	1.0000	1.0000
L11	11	HB114-1-0813U4-M5J(1-1/4)	90.75 - 98.00	1.0000	1.0000
L11	16	HB158-1-08U8-S8J18(1-5/8)	90.75 - 98.00	1.0000	1.0000
L11	20	Safety Line 3/8	90.75 - 98.00	1.0000	1.0000
L13	2	AL7-50(1-5/8)	84.75 - 89.75	1.0000	1.0000
L13	11	HB114-1-0813U4-M5J(1-1/4)	84.75 - 89.75	1.0000	1.0000
L13	16	HB158-1-08U8-S8J18(1-5/8)	84.75 - 89.75	1.0000	1.0000
L13	20	Safety Line 3/8	84.75 - 89.75	1.0000	1.0000
L14	2	AL7-50(1-5/8)	79.75 - 84.75	1.0000	1.0000
L14	11	HB114-1-0813U4-M5J(1-1/4)	79.75 - 84.75	1.0000	1.0000
L14	16	HB158-1-08U8-S8J18(1-5/8)	79.75 - 84.75	1.0000	1.0000
L14	20	Safety Line 3/8	79.75 - 84.75	1.0000	1.0000
L15	2	AL7-50(1-5/8)	74.75 - 79.75	1.0000	1.0000
L15	11	HB114-1-0813U4-M5J(1-1/4)	74.75 - 79.75	1.0000	1.0000
L15	16	HB158-1-08U8-S8J18(1-5/8)	74.75 - 79.75	1.0000	1.0000
L15	20	Safety Line 3/8	74.75 - 79.75	1.0000	1.0000
L15	22	CCI(4.5"x1")	74.75 - 76.00	1.0000	1.0000
L15	23	CCI(4.5"x1")	74.75 - 76.00	1.0000	1.0000
L15	24	CCI(4.5"x1")	74.75 - 76.00	1.0000	1.0000
L16	2	AL7-50(1-5/8)	74.50 - 74.75	1.0000	1.0000
L16	11	HB114-1-0813U4-M5J(1-1/4)	74.50 - 74.75	1.0000	1.0000
L16	16	HB158-1-08U8-S8J18(1-5/8)	74.50 - 74.75	1.0000	1.0000
L16	20	Safety Line 3/8	74.50 - 74.75	1.0000	1.0000
L16	22	CCI(4.5"x1")	74.50 - 74.75	1.0000	1.0000
L16	23	CCI(4.5"x1")	74.50 - 74.75	1.0000	1.0000
L16	24	CCI(4.5"x1")	74.50 - 74.75	1.0000	1.0000
L17	2	AL7-50(1-5/8)	74.25 - 74.50	1.0000	1.0000
L17	11	HB114-1-0813U4-M5J(1-1/4)	74.25 - 74.50	1.0000	1.0000
L17	16	HB158-1-08U8-S8J18(1-5/8)	74.25 - 74.50	1.0000	1.0000
L17	20	Safety Line 3/8	74.25 - 74.50	1.0000	1.0000
L17	22	CCI(4.5"x1")	74.25 - 74.50	1.0000	1.0000
L17	23	CCI(4.5"x1")	74.25 - 74.50	1.0000	1.0000
L17	24	CCI(4.5"x1")	74.25 - 74.50	1.0000	1.0000
L18	2	AL7-50(1-5/8)	69.25 - 74.25	1.0000	1.0000
L18	11	HB114-1-0813U4-M5J(1-1/4)	69.25 - 74.25	1.0000	1.0000
L18	16	HB158-1-08U8-S8J18(1-5/8)	69.25 - 74.25	1.0000	1.0000
L18	20	Safety Line 3/8	69.25 - 74.25	1.0000	1.0000
L18	22	CCI(4.5"x1")	69.25 - 74.25	1.0000	1.0000
L18	23	CCI(4.5"x1")	69.25 - 74.25	1.0000	1.0000
L18	24	CCI(4.5"x1")	69.25 - 74.25	1.0000	1.0000
L19	2	AL7-50(1-5/8)	64.25 - 69.25	1.0000	1.0000
L19	11	HB114-1-0813U4-M5J(1-1/4	64.25 - 69.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		)			
L19	16	HB158-1-08U8-S8J18(1-5/8)	64.25 - 69.25	1.0000	1.0000
L19	20	Safety Line 3/8	64.25 - 69.25	1.0000	1.0000
L19	22	CCI(4.5"x1")	64.25 - 69.25	1.0000	1.0000
L19	23	CCI(4.5"x1")	64.25 - 69.25	1.0000	1.0000
L19	24	CCI(4.5"x1")	64.25 - 69.25	1.0000	1.0000
L20	2	AL7-50(1-5/8)	59.25 - 64.25	1.0000	1.0000
L20	11	HB114-1-0813U4-M5J(1-1/4	59.25 - 64.25	1.0000	1.0000
		)			
L20	16	HB158-1-08U8-S8J18(1-5/8)	59.25 - 64.25	1.0000	1.0000
L20	20	Safety Line 3/8	59.25 - 64.25	1.0000	1.0000
L20	22	CCI(4.5"x1")	59.25 - 64.25	1.0000	1.0000
L20	23	CCI(4.5"x1")	59.25 - 64.25	1.0000	1.0000
L20	24	CCI(4.5"x1")	59.25 - 64.25	1.0000	1.0000
L21	2	AL7-50(1-5/8)	54.25 - 59.25	1.0000	1.0000
L21	11	HB114-1-0813U4-M5J(1-1/4	54.25 - 59.25	1.0000	1.0000
		)			
L21	16	HB158-1-08U8-S8J18(1-5/8)	54.25 - 59.25	1.0000	1.0000
L21	20	Safety Line 3/8	54.25 - 59.25	1.0000	1.0000
L21	22	CCI(4.5"x1")	54.25 - 59.25	1.0000	1.0000
L21	23	CCI(4.5"x1")	54.25 - 59.25	1.0000	1.0000
L21	24	CCI(4.5"x1")	54.25 - 59.25	1.0000	1.0000
L22	2	AL7-50(1-5/8)	44.75 - 54.25	1.0000	1.0000
L22	11	HB114-1-0813U4-M5J(1-1/4	44.75 - 54.25	1.0000	1.0000
		)			
L22	16	HB158-1-08U8-S8J18(1-5/8)	44.75 - 54.25	1.0000	1.0000
L22	20	Safety Line 3/8	44.75 - 54.25	1.0000	1.0000
L22	22	CCI(4.5"x1")	46.00 - 54.25	1.0000	1.0000
L22	23	CCI(4.5"x1")	46.00 - 54.25	1.0000	1.0000
L22	24	CCI(4.5"x1")	46.00 - 54.25	1.0000	1.0000
L24	2	AL7-50(1-5/8)	38.75 - 43.75	1.0000	1.0000
L24	11	HB114-1-0813U4-M5J(1-1/4	38.75 - 43.75	1.0000	1.0000
		)			
L24	16	HB158-1-08U8-S8J18(1-5/8)	38.75 - 43.75	1.0000	1.0000
L24	20	Safety Line 3/8	38.75 - 43.75	1.0000	1.0000
L25	2	AL7-50(1-5/8)	33.75 - 38.75	1.0000	1.0000
L25	11	HB114-1-0813U4-M5J(1-1/4	33.75 - 38.75	1.0000	1.0000
		)			
L25	16	HB158-1-08U8-S8J18(1-5/8)	33.75 - 38.75	1.0000	1.0000
L25	20	Safety Line 3/8	33.75 - 38.75	1.0000	1.0000
L26	2	AL7-50(1-5/8)	28.75 - 33.75	1.0000	1.0000
L26	11	HB114-1-0813U4-M5J(1-1/4	28.75 - 33.75	1.0000	1.0000
		)			
L26	16	HB158-1-08U8-S8J18(1-5/8)	28.75 - 33.75	1.0000	1.0000
L26	20	Safety Line 3/8	28.75 - 33.75	1.0000	1.0000
L27	2	AL7-50(1-5/8)	23.75 - 28.75	1.0000	1.0000
L27	11	HB114-1-0813U4-M5J(1-1/4	23.75 - 28.75	1.0000	1.0000
		)			
L27	16	HB158-1-08U8-S8J18(1-5/8)	23.75 - 28.75	1.0000	1.0000
L27	20	Safety Line 3/8	23.75 - 28.75	1.0000	1.0000
L28	2	AL7-50(1-5/8)	18.75 - 23.75	1.0000	1.0000
L28	11	HB114-1-0813U4-M5J(1-1/4	18.75 - 23.75	1.0000	1.0000
		)			
L28	16	HB158-1-08U8-S8J18(1-5/8)	18.75 - 23.75	1.0000	1.0000
L28	20	Safety Line 3/8	18.75 - 23.75	1.0000	1.0000
L29	2	AL7-50(1-5/8)	13.75 - 18.75	1.0000	1.0000
L29	11	HB114-1-0813U4-M5J(1-1/4	13.75 - 18.75	1.0000	1.0000
		)			
L29	16	HB158-1-08U8-S8J18(1-5/8)	13.75 - 18.75	1.0000	1.0000
L29	20	Safety Line 3/8	13.75 - 18.75	1.0000	1.0000
L30	2	AL7-50(1-5/8)	8.75 - 13.75	1.0000	1.0000
L30	11	HB114-1-0813U4-M5J(1-1/4	8.75 - 13.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		)			
L30	16	HB158-1-08U8-S8J18(1-5/8)	8.75 - 13.75	1.0000	1.0000
L30	20	Safety Line 3/8	8.75 - 13.75	1.0000	1.0000
L31	2	AL7-50(1-5/8)	3.75 - 8.75	1.0000	1.0000
L31	11	HB114-1-0813U4-M5J(1-1/4	3.75 - 8.75	1.0000	1.0000
		)			
L31	16	HB158-1-08U8-S8J18(1-5/8)	3.75 - 8.75	1.0000	1.0000
L31	20	Safety Line 3/8	3.75 - 8.75	1.0000	1.0000
L32	2	AL7-50(1-5/8)	0.00 - 3.75	1.0000	1.0000
L32	11	HB114-1-0813U4-M5J(1-1/4	0.00 - 3.75	1.0000	1.0000
		)			
L32	16	HB158-1-08U8-S8J18(1-5/8)	0.00 - 3.75	1.0000	1.0000
L32	20	Safety Line 3/8	0.00 - 3.75	1.0000	1.0000

D r r d

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR -32 B2A/B66AA	A	From Leg	4.000	0.000	146.000	No Ice	6.510	4.712	0.132
(E)			0.000			1/2" Ice	6.887	5.068	0.178
			0.000			1" Ice	7.271	5.431	0.229
						2" Ice	8.060	6.178	0.348
AIR -32 B2A/B66AA	B	From Leg	4.000	0.000	146.000	No Ice	6.510	4.712	0.132
(E)			0.000			1/2" Ice	6.887	5.068	0.178
			0.000			1" Ice	7.271	5.431	0.229
						2" Ice	8.060	6.178	0.348
AIR -32 B2A/B66AA	C	From Leg	4.000	0.000	146.000	No Ice	6.510	4.712	0.132
(E)			0.000			1/2" Ice	6.887	5.068	0.178
			0.000			1" Ice	7.271	5.431	0.229
						2" Ice	8.060	6.178	0.348
APX16DWV-16DWVS-E-A	A	From Leg	4.000	0.000	146.000	No Ice	6.996	2.359	0.042
20			0.000			1/2" Ice	7.391	2.722	0.077
(P)			0.000			1" Ice	7.794	3.092	0.117
						2" Ice	8.620	3.855	0.214
APX16DWV-16DWVS-E-A	B	From Leg	4.000	0.000	146.000	No Ice	6.996	2.359	0.042
20			0.000			1/2" Ice	7.391	2.722	0.077
(P)			0.000			1" Ice	7.794	3.092	0.117
						2" Ice	8.620	3.855	0.214
APX16DWV-16DWVS-E-A	C	From Leg	4.000	0.000	146.000	No Ice	6.996	2.359	0.042
20			0.000			1/2" Ice	7.391	2.722	0.077
(P)			0.000			1" Ice	7.794	3.092	0.117
						2" Ice	8.620	3.855	0.214
APXVAARR24_43-U-NA20	A	From Leg	4.000	0.000	146.000	No Ice	20.243	8.889	0.128
(P)			0.000			1/2" Ice	20.890	9.487	0.241
			-2.000			1" Ice	21.544	10.092	0.362
						2" Ice	22.874	11.326	0.630
APXVAARR24_43-U-NA20	B	From Leg	4.000	0.000	146.000	No Ice	20.243	8.889	0.128
(P)			0.000			1/2" Ice	20.890	9.487	0.241
			-2.000			1" Ice	21.544	10.092	0.362
						2" Ice	22.874	11.326	0.630

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVAARR24_43-U-NA20 (P)	C	From Leg	4.000 0.000 -2.000	0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	20.243 20.890 21.544 22.874	8.889 9.487 10.092 11.326	0.128 0.241 0.362 0.630
(3) RADIO 4449 B12/B71 (P)	A	From Leg	4.000 0.000 -2.000	0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.650 1.810 1.978 2.336	1.163 1.301 1.447 1.762	0.074 0.090 0.109 0.155
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	A	From Leg	4.000 0.000 0.000	0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	B	From Leg	4.000 0.000 0.000	0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
(4) 8' x 2" Pipe Mount (4 M.P./Sector)	C	From Leg	4.000 0.000 0.000	0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.900 2.728 3.401 4.396	1.900 2.728 3.401 4.396	0.029 0.044 0.063 0.119
Platform Mount [LP 303-1] (RMQP-496)	C	None		0.000	146.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.660 18.870 23.080 31.500	14.660 18.870 23.080 31.500	1.250 1.481 1.713 2.175
Miscellaneous [NA 507-1] (HRK-12)	C	None		0.000	148.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.800 6.700 8.600 12.400	4.800 6.700 8.600 12.400	0.245 0.294 0.343 0.441
***									
LLPX310R-V1 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 3.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.891 5.254 6.006	2.983 3.526 4.086 5.236	0.045 0.083 0.126 0.232
LLPX310R-V1 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 3.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.891 5.254 6.006	2.983 3.526 4.086 5.236	0.045 0.083 0.126 0.232
LLPX310R-V1 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 3.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.538 4.891 5.254 6.006	2.983 3.526 4.086 5.236	0.045 0.083 0.126 0.232
FPA5150-23PM-1 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 1.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.301 0.443 0.595 0.931	1.544 1.811 2.095 2.712	0.010 0.022 0.036 0.075
FDD_R6_RRH (E)	A	From Leg	4.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.533 1.690 1.854 2.204	0.684 0.800 0.923 1.193	0.033 0.045 0.058 0.094
FDD_R6_RRH (E)	B	From Leg	4.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.533 1.690 1.854 2.204	0.684 0.800 0.923 1.193	0.033 0.045 0.058 0.094
FDD_R6_RRH (E)	C	From Leg	4.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.533 1.690 1.854 2.204	0.684 0.800 0.923 1.193	0.033 0.045 0.058 0.094

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(6) ACU-A20-N	A	From Leg	4.000	0.000	138.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			0.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
(6) ACU-A20-N	B	From Leg	4.000	0.000	138.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			0.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
(6) ACU-A20-N	C	From Leg	4.000	0.000	138.000	No Ice	0.067	0.117	0.001
(E)			0.000			1/2" Ice	0.104	0.162	0.002
			0.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
DT465B-2XR w/ Mount Pipe	A	From Leg	4.000	0.000	138.000	No Ice	9.336	7.634	0.084
(R)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245
						2" Ice	11.530	11.543	0.442
DT465B-2XR w/ Mount Pipe	B	From Leg	4.000	0.000	138.000	No Ice	9.336	7.634	0.084
(R)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245
						2" Ice	11.530	11.543	0.442
DT465B-2XR w/ Mount Pipe	C	From Leg	4.000	0.000	138.000	No Ice	9.336	7.634	0.084
(R)			0.000			1/2" Ice	9.905	8.820	0.160
			2.000			1" Ice	10.439	9.718	0.245
						2" Ice	11.530	11.543	0.442
RRH2X50-800	A	From Leg	4.000	0.000	138.000	No Ice	1.701	1.282	0.053
(R)			0.000			1/2" Ice	1.864	1.428	0.070
			2.000			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
RRH2X50-800	B	From Leg	4.000	0.000	138.000	No Ice	1.701	1.282	0.053
(R)			0.000			1/2" Ice	1.864	1.428	0.070
			2.000			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
RRH2X50-800	C	From Leg	4.000	0.000	138.000	No Ice	1.701	1.282	0.053
(R)			0.000			1/2" Ice	1.864	1.428	0.070
			2.000			1" Ice	2.035	1.580	0.090
						2" Ice	2.398	1.908	0.138
TD-RRH8X20-25	A	From Leg	4.000	0.000	138.000	No Ice	4.045	1.535	0.070
(R)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	B	From Leg	4.000	0.000	138.000	No Ice	4.045	1.535	0.070
(R)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	C	From Leg	4.000	0.000	138.000	No Ice	4.045	1.535	0.070
(R)			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	138.000	No Ice	1.425	1.425	0.022
(E-DISHES)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	138.000	No Ice	1.425	1.425	0.022
(E-DISHES)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
Miscellaneous [NA 507-1]	C	None		0.000	138.000	No Ice	4.800	4.800	0.245

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(E)						1/2" Ice	6.700	6.700	0.294
						1" Ice	8.600	8.600	0.343
						2" Ice	12.400	12.400	0.441
Platform Mount [LP 303-1]	C	None		0.000	138.000	No Ice	14.660	14.660	1.250
(E)						1/2" Ice	18.870	18.870	1.481
						1" Ice	23.080	23.080	1.713
						2" Ice	31.500	31.500	2.175
***									
***									
TMA-DB-T1-6Z-8AB-0Z	A	From Leg	1.000	0.000	122.000	No Ice	4.800	2.000	0.044
(E)			0.000			1/2" Ice	5.070	2.193	0.080
			0.000			1" Ice	5.348	2.393	0.120
						2" Ice	5.926	2.815	0.213
6' x 2" Mount Pipe	A	From Leg	1.000	0.000	122.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
Side Arm Mount [SO 102-1]	A	From Leg	1.000	0.000	122.000	No Ice	1.500	1.500	0.025
(E)			0.000			1/2" Ice	1.740	1.750	0.035
			0.000			1" Ice	1.980	2.000	0.045
						2" Ice	2.460	2.500	0.065
***									
BXA-80063/4CF w/ Mount Pipe	A	From Leg	4.000	0.000	120.000	No Ice	4.945	3.424	0.028
			0.000			1/2" Ice	5.324	4.022	0.069
(E)			2.000			1" Ice	5.712	4.637	0.116
						2" Ice	6.514	5.916	0.229
BXA-80063/4CF w/ Mount Pipe	B	From Leg	4.000	0.000	120.000	No Ice	4.945	3.424	0.028
			0.000			1/2" Ice	5.324	4.022	0.069
(E)			2.000			1" Ice	5.712	4.637	0.116
						2" Ice	6.514	5.916	0.229
BXA-80063/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	120.000	No Ice	7.819	5.407	0.040
			0.000			1/2" Ice	8.370	6.558	0.099
(E)			2.000			1" Ice	8.886	7.422	0.166
						2" Ice	9.942	9.198	0.326
MG D3-800TV w/ Mount Pipe	A	From Leg	4.000	0.000	120.000	No Ice	3.570	3.418	0.037
			0.000			1/2" Ice	3.979	4.119	0.071
(E)			2.000			1" Ice	4.387	4.784	0.111
						2" Ice	5.199	6.164	0.210
MG D3-800TV w/ Mount Pipe	B	From Leg	4.000	0.000	120.000	No Ice	3.570	3.418	0.037
			0.000			1/2" Ice	3.979	4.119	0.071
(E)			2.000			1" Ice	4.387	4.784	0.111
						2" Ice	5.199	6.164	0.210
MG D3-800TV w/ Mount Pipe	C	From Leg	4.000	0.000	120.000	No Ice	3.570	3.418	0.037
			0.000			1/2" Ice	3.979	4.119	0.071
(E)			2.000			1" Ice	4.387	4.784	0.111
						2" Ice	5.199	6.164	0.210
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	120.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			2.000			1" Ice	9.505	9.185	0.211
						2" Ice	10.585	11.023	0.393
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	120.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			2.000			1" Ice	9.505	9.185	0.211
						2" Ice	10.585	11.023	0.393
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	120.000	No Ice	8.411	7.082	0.065
			0.000			1/2" Ice	8.975	8.273	0.134
(E)			2.000			1" Ice	9.505	9.185	0.211

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
						2" Ice	10.585	11.023	0.393
BXA-171063-8BF-EDIN-0	A	From Leg	4.000	0.000	120.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			2.000			1" Ice	3.930	4.595	0.099
						2" Ice	4.692	5.893	0.193
BXA-171063-8BF-EDIN-0	B	From Leg	4.000	0.000	120.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			2.000			1" Ice	3.930	4.595	0.099
						2" Ice	4.692	5.893	0.193
BXA-171063-8BF-EDIN-0	C	From Leg	4.000	0.000	120.000	No Ice	3.179	3.353	0.029
w/ Mount Pipe			0.000			1/2" Ice	3.555	3.971	0.061
(E)			2.000			1" Ice	3.930	4.595	0.099
						2" Ice	4.692	5.893	0.193
GPS_A	A	From Leg	4.000	0.000	120.000	No Ice	0.255	0.255	0.001
(E)			0.000			1/2" Ice	0.320	0.320	0.005
			6.000			1" Ice	0.393	0.393	0.010
						2" Ice	0.561	0.561	0.025
RRH2X40-AWS	A	From Leg	4.000	0.000	120.000	No Ice	2.161	1.420	0.044
(E)			0.000			1/2" Ice	2.360	1.590	0.061
			2.000			1" Ice	2.565	1.768	0.082
						2" Ice	2.999	2.143	0.132
RRH2X40-AWS	B	From Leg	4.000	0.000	120.000	No Ice	2.161	1.420	0.044
(E)			0.000			1/2" Ice	2.360	1.590	0.061
			2.000			1" Ice	2.565	1.768	0.082
						2" Ice	2.999	2.143	0.132
RRH2X40-AWS	C	From Leg	4.000	0.000	120.000	No Ice	2.161	1.420	0.044
(E)			0.000			1/2" Ice	2.360	1.590	0.061
			2.000			1" Ice	2.565	1.768	0.082
						2" Ice	2.999	2.143	0.132
FD9R6004/2C-3L	A	From Leg	4.000	0.000	120.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			2.000			1" Ice	0.466	0.169	0.009
						2" Ice	0.647	0.294	0.020
FD9R6004/2C-3L	B	From Leg	4.000	0.000	120.000	No Ice	0.314	0.076	0.003
(E)			0.000			1/2" Ice	0.386	0.119	0.005
			2.000			1" Ice	0.466	0.169	0.009
						2" Ice	0.647	0.294	0.020
5' x 2" Pipe Mount	A	From Leg	4.000	0.000	120.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
						2" Ice	2.351	2.351	0.082
5' x 2" Pipe Mount	A	From Leg	4.000	0.000	120.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
						2" Ice	2.351	2.351	0.082
5' x 2" Pipe Mount	A	From Leg	4.000	0.000	120.000	No Ice	1.000	1.000	0.029
(E)			0.000			1/2" Ice	1.393	1.393	0.037
			0.000			1" Ice	1.703	1.703	0.048
						2" Ice	2.351	2.351	0.082
Platform Mount [LP 1201-1]	C	None		0.000	120.000	No Ice	23.100	23.100	2.100
(E)						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
***									
KS24019-L112A	B	From Leg	3.000	0.000	90.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			0.000			1" Ice	0.262	0.262	0.009

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 701-1] (E) ***	B	From Leg	3.000 0.000 0.000	0.000	90.000	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.415 0.850 1.140 1.430 2.010	0.415 1.670 2.340 3.010 4.350	0.018 0.065 0.079 0.093 0.121

D

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11 (E)	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 -4.000	80.000		138.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice	3.715 4.006 4.296 4.876	0.027 0.048 0.068 0.109
VHLP2-11 (E)	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 -4.000	40.000		138.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice	3.715 4.006 4.296 4.876	0.027 0.048 0.068 0.109
$$$											

d

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice

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

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 143	Pole	Max Tension	14	0.000	-0.001	0.000
			Max. Compression	26	-7.953	0.094	2.339
			Max. Mx	20	-3.462	12.753	1.292
			Max. My	2	-3.451	0.025	14.146
			Max. Vy	8	5.235	-12.709	1.297
			Max. Vx	2	-5.275	0.025	14.146
			Max. Torque	8			0.811
L2	143 - 138	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-8.748	0.260	2.470
			Max. Mx	20	-3.859	39.705	1.318
			Max. My	2	-3.848	0.066	41.290
			Max. Vy	8	5.532	-39.586	1.332
			Max. Vx	14	5.573	0.066	-38.511
			Max. Torque	8			0.811
L3	138 - 133	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-15.547	0.673	1.582
			Max. Mx	20	-6.962	87.887	1.207
			Max. My	2	-6.940	0.280	89.450
			Max. Vy	8	9.281	-87.637	1.129
			Max. Vx	2	-9.339	0.280	89.450
			Max. Torque	7			-0.894
L4	133 - 128	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-16.457	0.846	1.656

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	20	-7.445	134.954	1.108
			Max. My	2	-7.423	0.393	136.977
			Max. Vy	8	9.619	-134.835	1.331
			Max. Vx	2	-9.677	0.393	136.977
			Max. Torque	7			-0.894
L5	128 - 123	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.392	1.025	1.730
			Max. Mx	8	-7.946	-183.734	1.534
			Max. My	2	-7.929	0.507	186.206
			Max. Vy	8	9.963	-183.734	1.534
			Max. Vx	2	-10.021	0.507	186.206
			Max. Torque	7			-0.894
L6	123 - 118	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.419	1.457	3.425
			Max. Mx	8	-11.674	-246.448	2.434
			Max. My	2	-11.644	0.605	250.457
			Max. Vy	8	14.010	-246.448	2.434
			Max. Vx	2	-14.176	0.605	250.457
			Max. Torque	7			-0.894
L7	118 - 113	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.531	1.615	3.536
			Max. Mx	8	-12.339	-317.301	2.696
			Max. My	2	-12.309	0.668	322.180
			Max. Vy	8	14.357	-317.301	2.696
			Max. Vx	2	-14.524	0.668	322.180
			Max. Torque	16			-0.386
L8	113 - 108	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.667	1.775	3.645
			Max. Mx	8	-13.029	-389.883	2.957
			Max. My	2	-13.000	0.732	395.635
			Max. Vy	8	14.704	-389.883	2.957
			Max. Vx	2	-14.870	0.732	395.635
			Max. Torque	16			-0.386
L9	108 - 103	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-28.826	1.937	3.751
			Max. Mx	8	-13.743	-464.193	3.218
			Max. My	2	-13.716	0.797	470.817
			Max. Vy	8	15.050	-464.193	3.218
			Max. Vx	2	-15.217	0.797	470.817
			Max. Torque	16			-0.386
L10	103 - 98	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-30.010	2.102	3.855
			Max. Mx	8	-14.481	-540.228	3.478
			Max. My	2	-14.456	0.862	547.724
			Max. Vy	8	15.396	-540.228	3.478
			Max. Vx	2	-15.562	0.862	547.724
			Max. Torque	16			-0.386
L11	98 - 90.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-30.793	2.211	3.922
			Max. Mx	8	-14.973	-590.572	3.646
			Max. My	2	-14.948	0.906	598.635
			Max. Vy	8	15.619	-590.572	3.646
			Max. Vx	2	-15.785	0.906	598.635
			Max. Torque	16			-0.386
L12	90.75 - 89.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-32.894	1.888	3.741
			Max. Mx	8	-16.313	-669.974	3.738
			Max. My	2	-16.288	0.673	678.420
			Max. Vy	8	16.085	-669.974	3.738
			Max. Vx	2	-16.267	0.673	678.420
			Max. Torque	24			-0.482

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L13	89.75 - 84.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.256	2.059	3.842
			Max. Mx	8	-17.219	-751.200	4.065
			Max. My	2	-17.195	0.673	760.599
			Max. Vy	8	16.440	-751.200	4.065
			Max. Vx	2	-16.622	0.673	760.599
			Max. Torque	24			-0.482
L14	84.75 - 79.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.645	2.231	3.943
			Max. Mx	8	-18.149	-834.198	4.391
			Max. My	2	-18.127	0.674	844.549
			Max. Vy	8	16.795	-834.198	4.391
			Max. Vx	2	-16.976	0.674	844.549
			Max. Torque	24			-0.482
L15	79.75 - 74.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.094	2.407	4.043
			Max. Mx	8	-19.105	-918.958	4.716
			Max. My	2	-19.084	0.677	930.261
			Max. Vy	8	17.147	-918.958	4.716
			Max. Vx	2	-17.328	0.677	930.261
			Max. Torque	24			-0.482
L16	74.75 - 74.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.172	2.421	4.056
			Max. Mx	8	-19.159	-923.244	4.733
			Max. My	2	-19.139	0.676	934.597
			Max. Vy	8	17.180	-923.244	4.733
			Max. Vx	2	-17.378	0.676	934.597
			Max. Torque	24			-0.482
L17	74.5 - 74.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.250	2.430	4.061
			Max. Mx	8	-19.207	-927.533	4.750
			Max. My	2	-19.187	0.677	938.933
			Max. Vy	8	17.198	-927.533	4.750
			Max. Vx	2	-17.396	0.677	938.933
			Max. Torque	24			-0.482
L18	74.25 - 69.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.825	2.602	4.151
			Max. Mx	8	-20.184	-1014.214	5.073
			Max. My	2	-20.165	0.681	1026.563
			Max. Vy	8	17.531	-1014.214	5.073
			Max. Vx	14	17.961	0.160	-1021.262
			Max. Torque	24			-0.482
L19	69.25 - 64.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.425	2.782	4.248
			Max. Mx	8	-21.191	-1102.628	5.396
			Max. My	2	-21.174	0.686	1115.927
			Max. Vy	8	17.876	-1102.628	5.396
			Max. Vx	14	18.567	0.250	-1112.510
			Max. Torque	24			-0.481
L20	64.25 - 59.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-42.050	2.964	4.345
			Max. Mx	8	-22.223	-1192.751	5.718
			Max. My	2	-22.207	0.692	1206.998
			Max. Vy	8	18.216	-1192.751	5.718
			Max. Vx	14	19.167	0.341	-1206.772
			Max. Torque	24			-0.481
L21	59.25 - 54.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-43.698	3.148	4.439
			Max. Mx	8	-23.278	-1284.556	6.039
			Max. My	14	-23.213	0.434	-1304.018
			Max. Vy	8	18.550	-1284.556	6.039

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	14	19.762	0.434	-1304.018
			Max. Torque	24			-0.481
L22	54.25 - 44.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45.104	3.307	4.519
			Max. Mx	8	-24.193	-1363.879	6.310
			Max. My	14	-24.133	0.514	-1388.523
			Max. Vy	8	18.824	-1363.879	6.310
			Max. Vx	14	20.035	0.514	-1388.523
			Max. Torque	24			-0.481
L23	44.75 - 43.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-48.573	3.541	4.637
			Max. Mx	8	-26.562	-1482.991	6.709
			Max. My	14	-26.507	0.632	-1515.256
			Max. Vy	8	19.321	-1482.991	6.709
			Max. Vx	14	20.533	0.632	-1515.256
			Max. Torque	24			-0.481
L24	43.75 - 38.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-50.316	3.720	4.718
			Max. Mx	8	-27.832	-1580.281	7.027
			Max. My	14	-27.782	0.727	-1618.643
			Max. Vy	8	19.640	-1580.281	7.027
			Max. Vx	14	20.851	0.727	-1618.643
			Max. Torque	24			-0.481
L25	38.75 - 33.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-52.086	3.895	4.792
			Max. Mx	8	-29.128	-1679.133	7.344
			Max. My	14	-29.084	0.824	-1723.586
			Max. Vy	8	19.947	-1679.133	7.344
			Max. Vx	14	21.157	0.824	-1723.586
			Max. Torque	24			-0.481
L26	33.75 - 28.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-53.881	4.073	4.868
			Max. Mx	8	-30.452	-1779.484	7.659
			Max. My	14	-30.414	0.921	-1830.021
			Max. Vy	8	20.240	-1779.484	7.659
			Max. Vx	14	21.448	0.921	-1830.021
			Max. Torque	24			-0.480
L27	28.75 - 23.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-55.699	4.253	4.943
			Max. Mx	8	-31.803	-1881.292	7.973
			Max. My	14	-31.771	1.019	-1937.904
			Max. Vy	8	20.531	-1881.292	7.973
			Max. Vx	14	21.736	1.019	-1937.904
			Max. Torque	24			-0.480
L28	23.75 - 18.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-57.540	4.436	5.019
			Max. Mx	8	-33.180	-1984.555	8.284
			Max. My	14	-33.155	1.119	-2047.230
			Max. Vy	8	20.823	-1984.555	8.284
			Max. Vx	14	22.025	1.119	-2047.230
			Max. Torque	24			-0.480
L29	18.75 - 13.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-59.399	4.620	5.095
			Max. Mx	8	-34.584	-2089.283	8.594
			Max. My	14	-34.565	1.219	-2158.006
			Max. Vy	8	21.117	-2089.283	8.594
			Max. Vx	14	22.316	1.219	-2158.006
			Max. Torque	24			-0.480
L30	13.75 - 8.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.272	4.805	5.170
			Max. Mx	8	-36.014	-2195.484	8.902

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-36.002	1.320	-2270.240
			Max. Vy	8	21.413	-2195.484	8.902
			Max. Vx	14	22.608	1.320	-2270.240
			Max. Torque	24			-0.480
L31	8.75 - 3.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-63.146	4.989	5.243
			Max. Mx	8	-37.471	-2303.167	9.207
			Max. My	14	-37.465	1.422	-2383.938
			Max. Vy	8	21.710	-2303.167	9.207
			Max. Vx	14	22.902	1.422	-2383.938
			Max. Torque	24			-0.480
L32	3.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-64.531	5.123	5.293
			Max. Mx	8	-38.580	-2384.908	9.435
			Max. My	14	-38.579	1.499	-2470.177
			Max. Vy	8	21.938	-2384.908	9.435
			Max. Vx	14	23.126	1.499	-2470.177
			Max. Torque	24			-0.480

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	64.531	-0.000	-0.001
	Max. H_x	21	28.941	21.881	-0.043
	Max. H_z	3	28.941	-0.009	22.092
	Max. M_x	2	2410.212	-0.009	22.090
	Max. M_z	8	2384.908	-21.922	0.059
	Max. Torsion	10	0.276	-18.981	-11.040
	Min. Vert	15	28.941	0.008	-23.111
	Min. H_x	8	38.589	-21.922	0.059
	Min. H_z	15	28.941	0.008	-23.111
	Min. M_x	14	-2470.177	0.008	-23.109
	Min. M_z	20	-2381.362	21.880	-0.043
	Min. Torsion	24	-0.480	10.917	19.124

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Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	32.157	0.000	0.001	-1.471	0.945	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	38.588	0.009	-22.090	-2410.212	0.835	0.119
0.9 Dead+1.0 Wind 0 deg - No Ice	28.941	0.009	-22.092	-2378.009	0.518	0.122
1.2 Dead+1.0 Wind 30 deg - No Ice	38.589	11.013	-19.117	-2085.109	-1198.434	0.227
0.9 Dead+1.0 Wind 30 deg - No Ice	28.942	11.013	-19.117	-2057.008	-1182.873	0.253
1.2 Dead+1.0 Wind 60 deg - No Ice	38.589	19.940	-11.604	-1244.266	-2130.302	0.231

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
0.9 Dead+1.0 Wind 60 deg - No Ice	28.942	19.940	-11.604	-1227.507	-2102.786	0.272
1.2 Dead+1.0 Wind 90 deg - No Ice	38.589	21.922	-0.059	-9.435	-2384.908	0.045
0.9 Dead+1.0 Wind 90 deg - No Ice	28.941	21.921	-0.059	-8.801	-2353.585	0.091
1.2 Dead+1.0 Wind 120 deg - No Ice	38.589	18.981	11.040	1202.150	-2064.987	-0.276
0.9 Dead+1.0 Wind 120 deg - No Ice	28.942	18.981	11.040	1186.735	-2037.951	-0.238
1.2 Dead+1.0 Wind 150 deg - No Ice	38.589	10.966	19.096	2079.150	-1193.294	-0.210
0.9 Dead+1.0 Wind 150 deg - No Ice	28.942	10.966	19.096	2052.133	-1177.790	-0.190
1.2 Dead+1.0 Wind 180 deg - No Ice	38.588	-0.008	23.109	2470.177	1.499	0.057
0.9 Dead+1.0 Wind 180 deg - No Ice	28.941	-0.008	23.111	2438.633	1.190	0.054
1.2 Dead+1.0 Wind 210 deg - No Ice	38.589	-10.980	19.089	2077.313	1196.131	0.093
0.9 Dead+1.0 Wind 210 deg - No Ice	28.942	-10.980	19.089	2050.331	1180.008	0.067
1.2 Dead+1.0 Wind 240 deg - No Ice	38.589	-18.961	11.039	1200.461	2063.735	0.033
0.9 Dead+1.0 Wind 240 deg - No Ice	28.942	-18.961	11.039	1185.086	2036.134	-0.008
1.2 Dead+1.0 Wind 270 deg - No Ice	38.588	-21.880	0.043	3.285	2381.362	0.168
0.9 Dead+1.0 Wind 270 deg - No Ice	28.941	-21.881	0.043	3.752	2349.760	0.123
1.2 Dead+1.0 Wind 300 deg - No Ice	38.589	-19.863	-11.550	-1238.135	2122.700	0.354
0.9 Dead+1.0 Wind 300 deg - No Ice	28.942	-19.863	-11.550	-1221.453	2094.692	0.316
1.2 Dead+1.0 Wind 330 deg - No Ice	38.589	-10.917	-19.124	-2087.084	1188.794	0.480
0.9 Dead+1.0 Wind 330 deg - No Ice	28.942	-10.917	-19.124	-2058.948	1172.764	0.461
1.2 Dead+1.0 Ice+1.0 Temp	64.531	0.000	0.001	-5.293	5.123	0.001
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	64.531	0.002	-5.748	-649.691	5.260	0.028
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	64.531	2.867	-4.975	-562.714	-315.742	0.008
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	64.531	4.953	-2.879	-328.030	-549.250	-0.022
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	64.531	5.713	-0.012	-6.927	-634.203	-0.071
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	64.531	4.946	2.872	316.661	-548.465	-0.125
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	64.531	2.857	4.970	551.458	-314.814	-0.084
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	64.531	-0.002	5.739	637.374	5.233	0.008
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	64.531	-2.860	4.969	550.992	325.267	0.056
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	64.531	-4.942	2.872	316.165	558.124	0.075
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	64.531	-5.705	0.009	-4.447	643.522	0.115
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	64.531	-4.938	-2.868	-326.895	557.750	0.143

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Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	64.531	-2.848	-4.976	-563.205	323.885	0.141
Dead+Wind 0 deg - Service	32.157	0.002	-4.554	-494.426	0.919	0.025
Dead+Wind 30 deg - Service	32.157	2.270	-3.940	-427.789	-244.424	0.050
Dead+Wind 60 deg - Service	32.157	4.110	-2.392	-255.800	-435.114	0.053
Dead+Wind 90 deg - Service	32.157	4.519	-0.012	-3.152	-487.207	0.016
Dead+Wind 120 deg - Service	32.157	3.912	2.275	244.704	-421.692	-0.051
Dead+Wind 150 deg - Service	32.157	2.260	3.936	424.120	-243.369	-0.040
Dead+Wind 180 deg - Service	32.157	-0.002	4.764	504.306	1.057	0.012
Dead+Wind 210 deg - Service	32.157	-2.263	3.935	423.744	245.448	0.015
Dead+Wind 240 deg - Service	32.157	-3.908	2.275	244.359	422.933	0.000
Dead+Wind 270 deg - Service	32.157	-4.511	0.009	-0.550	488.032	0.029
Dead+Wind 300 deg - Service	32.157	-4.094	-2.381	-254.543	435.052	0.069
Dead+Wind 330 deg - Service	32.157	-2.250	-3.942	-428.191	243.949	0.098

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-32.157	0.000	-0.000	32.157	-0.001	0.003%
2	0.009	-38.589	-22.095	-0.009	38.588	22.090	0.011%
3	0.009	-28.942	-22.095	-0.009	28.941	22.092	0.009%
4	11.013	-38.589	-19.117	-11.013	38.589	19.117	0.000%
5	11.013	-28.942	-19.117	-11.013	28.942	19.117	0.000%
6	19.940	-38.589	-11.604	-19.940	38.589	11.604	0.000%
7	19.940	-28.942	-11.604	-19.940	28.942	11.604	0.000%
8	21.925	-38.589	-0.059	-21.922	38.589	0.059	0.006%
9	21.925	-28.942	-0.059	-21.921	28.941	0.059	0.009%
10	18.981	-38.589	11.040	-18.981	38.589	-11.040	0.000%
11	18.981	-28.942	11.040	-18.981	28.942	-11.040	0.000%
12	10.966	-38.589	19.096	-10.966	38.589	-19.096	0.000%
13	10.966	-28.942	19.096	-10.966	28.942	-19.096	0.000%
14	-0.008	-38.589	23.114	0.008	38.588	-23.109	0.011%
15	-0.008	-28.942	23.114	0.008	28.941	-23.111	0.009%
16	-10.980	-38.589	19.089	10.980	38.589	-19.089	0.000%
17	-10.980	-28.942	19.089	10.980	28.942	-19.089	0.000%
18	-18.961	-38.589	11.039	18.961	38.589	-11.039	0.000%
19	-18.961	-28.942	11.039	18.961	28.942	-11.039	0.000%
20	-21.884	-38.589	0.043	21.880	38.588	-0.043	0.011%
21	-21.884	-28.942	0.043	21.881	28.941	-0.043	0.009%
22	-19.863	-38.589	-11.550	19.863	38.589	11.550	0.000%
23	-19.863	-28.942	-11.550	19.863	28.942	11.550	0.000%
24	-10.917	-38.589	-19.124	10.917	38.589	19.124	0.000%
25	-10.917	-28.942	-19.124	10.917	28.942	19.124	0.000%
26	0.000	-64.531	0.000	-0.000	64.531	-0.001	0.001%
27	0.002	-64.531	-5.748	-0.002	64.531	5.748	0.000%
28	2.867	-64.531	-4.975	-2.867	64.531	4.975	0.000%
29	4.954	-64.531	-2.879	-4.953	64.531	2.879	0.000%
30	5.713	-64.531	-0.012	-5.713	64.531	0.012	0.000%
31	4.946	-64.531	2.873	-4.946	64.531	-2.872	0.000%
32	2.857	-64.531	4.971	-2.857	64.531	-4.970	0.000%
33	-0.002	-64.531	5.739	0.002	64.531	-5.739	0.000%
34	-2.860	-64.531	4.969	2.860	64.531	-4.969	0.000%
35	-4.943	-64.531	2.873	4.942	64.531	-2.872	0.000%
36	-5.705	-64.531	0.009	5.705	64.531	-0.009	0.000%
37	-4.938	-64.531	-2.868	4.938	64.531	2.868	0.000%
38	-2.848	-64.531	-4.976	2.848	64.531	4.976	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
39	0.002	-32.157	-4.555	-0.002	32.157	4.554	0.003%
40	2.270	-32.157	-3.941	-2.270	32.157	3.940	0.003%
41	4.111	-32.157	-2.392	-4.110	32.157	2.392	0.003%
42	4.520	-32.157	-0.012	-4.519	32.157	0.012	0.003%
43	3.913	-32.157	2.276	-3.912	32.157	-2.275	0.003%
44	2.261	-32.157	3.937	-2.260	32.157	-3.936	0.003%
45	-0.002	-32.157	4.765	0.002	32.157	-4.764	0.003%
46	-2.263	-32.157	3.935	2.263	32.157	-3.935	0.003%
47	-3.909	-32.157	2.276	3.908	32.157	-2.275	0.003%
48	-4.511	-32.157	0.009	4.511	32.157	-0.009	0.003%
49	-4.095	-32.157	-2.381	4.094	32.157	2.381	0.003%
50	-2.251	-32.157	-3.942	2.250	32.157	3.942	0.003%

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Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000679
2	Yes	18	0.00010944	0.00013633
3	Yes	18	0.00007339	0.00009663
4	Yes	26	0.00000001	0.00011161
5	Yes	25	0.00000001	0.00014300
6	Yes	26	0.00000001	0.00011387
7	Yes	25	0.00000001	0.00014505
8	Yes	19	0.00006254	0.00009161
9	Yes	18	0.00007347	0.00010298
10	Yes	26	0.00000001	0.00010921
11	Yes	25	0.00000001	0.00014022
12	Yes	26	0.00000001	0.00011029
13	Yes	25	0.00000001	0.00014143
14	Yes	18	0.00010918	0.00013869
15	Yes	18	0.00007322	0.00009675
16	Yes	26	0.00000001	0.00011010
17	Yes	25	0.00000001	0.00014109
18	Yes	26	0.00000001	0.00010926
19	Yes	25	0.00000001	0.00014027
20	Yes	18	0.00010956	0.00013762
21	Yes	18	0.00007348	0.00009313
22	Yes	26	0.00000001	0.00011393
23	Yes	25	0.00000001	0.00014522
24	Yes	26	0.00000001	0.00010940
25	Yes	25	0.00000001	0.00014002
26	Yes	13	0.00000001	0.00013554
27	Yes	23	0.00000001	0.00009575
28	Yes	23	0.00000001	0.00011787
29	Yes	23	0.00000001	0.00011776
30	Yes	23	0.00000001	0.00009275
31	Yes	23	0.00000001	0.00011399
32	Yes	23	0.00000001	0.00011444
33	Yes	23	0.00000001	0.00009272
34	Yes	23	0.00000001	0.00011655
35	Yes	23	0.00000001	0.00011594
36	Yes	23	0.00000001	0.00009441
37	Yes	23	0.00000001	0.00011973
38	Yes	23	0.00000001	0.00011974
39	Yes	18	0.00000001	0.00003024

40	Yes	18	0.00000001	0.00012101
41	Yes	18	0.00000001	0.00012167
42	Yes	18	0.00000001	0.00002967
43	Yes	18	0.00000001	0.00011355
44	Yes	18	0.00000001	0.00011709
45	Yes	18	0.00000001	0.00003012
46	Yes	18	0.00000001	0.00011712
47	Yes	18	0.00000001	0.00011545
48	Yes	18	0.00000001	0.00002986
49	Yes	18	0.00000001	0.00012553
50	Yes	18	0.00000001	0.00011545

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	20.249	41	1.218	0.001
L2	143 - 138	18.980	41	1.217	0.001
L3	138 - 133	17.716	41	1.210	0.001
L4	133 - 128	16.463	41	1.191	0.001
L5	128 - 123	15.234	41	1.165	0.001
L6	123 - 118	14.035	41	1.132	0.001
L7	118 - 113	12.872	41	1.093	0.001
L8	113 - 108	11.753	41	1.048	0.001
L9	108 - 103	10.683	41	0.997	0.001
L10	103 - 98	9.667	41	0.943	0.000
L11	98 - 90.75	8.709	41	0.887	0.000
L12	94.75 - 89.75	8.118	41	0.849	0.000
L13	89.75 - 84.75	7.244	41	0.817	0.000
L14	84.75 - 79.75	6.415	41	0.766	0.000
L15	79.75 - 74.75	5.641	41	0.714	0.000
L16	74.75 - 74.5	4.921	41	0.661	0.000
L17	74.5 - 74.25	4.886	41	0.659	0.000
L18	74.25 - 69.25	4.852	41	0.656	0.000
L19	69.25 - 64.25	4.192	41	0.604	0.000
L20	64.25 - 59.25	3.587	41	0.551	0.000
L21	59.25 - 54.25	3.037	41	0.499	0.000
L22	54.25 - 44.75	2.542	41	0.447	0.000
L23	50 - 43.75	2.163	41	0.403	0.000
L24	43.75 - 38.75	1.655	41	0.369	0.000
L25	38.75 - 33.75	1.292	41	0.325	0.000
L26	33.75 - 28.75	0.975	41	0.281	0.000
L27	28.75 - 23.75	0.704	41	0.237	0.000
L28	23.75 - 18.75	0.478	41	0.195	0.000
L29	18.75 - 13.75	0.296	41	0.152	0.000
L30	13.75 - 8.75	0.158	41	0.111	0.000
L31	8.75 - 3.75	0.064	41	0.070	0.000
L32	3.75 - 0	0.012	41	0.030	0.000

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Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.000	Miscellaneous [NA 507-1]	41	20.249	1.218	0.001	69921

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
146.000	AIR -32 B2A/B66AA	41	19.741	1.218	0.001	69921
138.000	LLPX310R-V1 w/ Mount Pipe	41	17.716	1.210	0.001	22956
134.000	VHLP2-11	41	16.712	1.196	0.001	13841
122.000	TMA-DB-T1-6Z-8AB-0Z	41	13.799	1.125	0.001	7765
120.000	BXA-80063/4CF w/ Mount Pipe	41	13.332	1.109	0.001	7246
90.000	KS24019-L112A	41	7.286	0.819	0.000	6563

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	98.912	14	5.916	0.005
L2	143 - 138	92.740	14	5.912	0.005
L3	138 - 133	86.583	14	5.884	0.004
L4	133 - 128	80.481	14	5.799	0.004
L5	128 - 123	74.487	14	5.675	0.004
L6	123 - 118	68.639	14	5.518	0.004
L7	118 - 113	62.967	14	5.334	0.003
L8	113 - 108	57.503	14	5.117	0.003
L9	108 - 103	52.276	14	4.875	0.003
L10	103 - 98	47.312	14	4.615	0.002
L11	98 - 90.75	42.627	14	4.340	0.002
L12	94.75 - 89.75	39.738	14	4.155	0.002
L13	89.75 - 84.75	35.461	14	3.999	0.002
L14	84.75 - 79.75	31.407	14	3.748	0.002
L15	79.75 - 74.75	27.617	14	3.494	0.001
L16	74.75 - 74.5	24.094	14	3.239	0.001
L17	74.5 - 74.25	23.924	14	3.226	0.001
L18	74.25 - 69.25	23.756	14	3.213	0.001
L19	69.25 - 64.25	20.527	14	2.957	0.001
L20	64.25 - 59.25	17.566	14	2.701	0.001
L21	59.25 - 54.25	14.873	14	2.445	0.001
L22	54.25 - 44.75	12.446	14	2.190	0.001
L23	50 - 43.75	10.593	14	1.975	0.001
L24	43.75 - 38.75	8.105	14	1.808	0.001
L25	38.75 - 33.75	6.326	14	1.590	0.000
L26	33.75 - 28.75	4.774	14	1.375	0.000
L27	28.75 - 23.75	3.446	14	1.162	0.000
L28	23.75 - 18.75	2.339	14	0.953	0.000
L29	18.75 - 13.75	1.450	14	0.746	0.000
L30	13.75 - 8.75	0.776	14	0.543	0.000
L31	8.75 - 3.75	0.312	14	0.342	0.000
L32	3.75 - 0	0.057	14	0.146	0.000

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Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.000	Miscellaneous [NA 507-1]	14	98.912	5.916	0.005	18399
146.000	AIR -32 B2A/B66AA	14	96.443	5.916	0.005	18399

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.000	LLPX310R-V1 w/ Mount Pipe	14	86.583	5.884	0.004	5190
134.000	VHLP2-11	14	81.694	5.820	0.004	3011
122.000	TMA-DB-T1-6Z-8AB-0Z	14	67.490	5.484	0.004	1645
120.000	BXA-80063/4CF w/ Mount Pipe	14	65.213	5.411	0.003	1536
90.000	KS24019-L112A	14	35.670	4.008	0.002	1362

Compression Checks

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Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	148 - 143 (1)	TP24x24x0.25	5.000	0.000	0.0	18.653	-3.451	753.823	0.005
L2	143 - 138 (2)	TP24x24x0.25	5.000	0.000	0.0	18.653	-3.848	753.823	0.005
L3	138 - 133 (3)	TP23.05x22x0.25	5.000	0.000	0.0	18.092	-6.940	1240.740	0.006
L4	133 - 128 (4)	TP24.1x23.05x0.25	5.000	0.000	0.0	18.925	-7.423	1297.890	0.006
L5	128 - 123 (5)	TP25.15x24.1x0.25	5.000	0.000	0.0	19.758	-7.929	1352.360	0.006
L6	123 - 118 (6)	TP26.201x25.15x0.25	5.000	0.000	0.0	20.592	-11.644	1395.100	0.008
L7	118 - 113 (7)	TP27.251x26.201x0.25	5.000	0.000	0.0	21.425	-12.310	1436.690	0.009
L8	113 - 108 (8)	TP28.301x27.251x0.25	5.000	0.000	0.0	22.258	-13.001	1477.120	0.009
L9	108 - 103 (9)	TP29.351x28.301x0.25	5.000	0.000	0.0	23.092	-13.716	1516.390	0.009
L10	103 - 98 (10)	TP30.401x29.351x0.25	5.000	0.000	0.0	23.925	-14.456	1554.510	0.009
L11	98 - 90.75 (11)	TP31.924x30.401x0.25	7.250	0.000	0.0	24.467	-14.948	1578.660	0.009
L12	90.75 - 89.75 (12)	TP31.634x30.584x0.313	5.000	0.000	0.0	31.067	-16.288	2123.150	0.008
L13	89.75 - 84.75 (13)	TP32.684x31.634x0.313	5.000	0.000	0.0	32.109	-17.195	2176.510	0.008
L14	84.75 - 79.75 (14)	TP33.735x32.684x0.313	5.000	0.000	0.0	33.151	-18.127	2228.710	0.008
L15	79.75 - 74.75 (15)	TP34.785x33.735x0.313	5.000	0.000	0.0	34.192	-19.084	2279.750	0.008
L16	74.75 - 74.5 (16)	TP34.837x34.785x0.313	0.250	0.000	0.0	34.244	-19.139	2282.280	0.008
L17	74.5 - 74.25 (17)	TP34.89x34.837x0.313	0.250	0.000	0.0	34.296	-19.187	2284.800	0.008
L18	74.25 - 69.25 (18)	TP35.94x34.89x0.313	5.000	0.000	0.0	35.338	-20.166	2334.570	0.009
L19	69.25 - 64.25 (19)	TP36.99x35.94x0.313	5.000	0.000	0.0	36.380	-21.174	2383.190	0.009
L20	64.25 - 59.25 (20)	TP38.04x36.99x0.313	5.000	0.000	0.0	37.421	-22.207	2430.650	0.009
L21	59.25 - 54.25 (21)	TP39.091x38.04x0.313	5.000	0.000	0.0	38.463	-23.213	2476.950	0.009
L22	54.25 - 44.75 (22)	TP41.086x39.091x0.313	9.500	0.000	0.0	39.348	-24.134	2515.400	0.010
L23	44.75 - 43.75 (23)	TP40.671x39.358x0.375	6.250	0.000	0.0	47.962	-26.506	3220.500	0.008
L24	43.75 - 38.75 (24)	TP41.721x40.671x0.375	5.000	0.000	0.0	49.212	-27.782	3281.660	0.008
L25	38.75 - 33.75 (25)	TP42.771x41.721x0.375	5.000	0.000	0.0	50.462	-29.084	3341.670	0.009
L26	33.75 - 28.75 (26)	TP43.822x42.771x0.375	5.000	0.000	0.0	51.712	-30.414	3400.510	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L27	28.75 - 23.75 (27)	TP44.872x43.822x0.375	5.000	0.000	0.0	52.962	-31.771	3458.210	0.009
L28	23.75 - 18.75 (28)	TP45.922x44.872x0.375	5.000	0.000	0.0	54.212	-33.155	3514.740	0.009
L29	18.75 - 13.75 (29)	TP46.972x45.922x0.375	5.000	0.000	0.0	55.462	-34.565	3570.120	0.010
L30	13.75 - 8.75 (30)	TP48.022x46.972x0.375	5.000	0.000	0.0	56.712	-36.002	3624.340	0.010
L31	8.75 - 3.75 (31)	TP49.072x48.022x0.375	5.000	0.000	0.0	57.962	-37.465	3677.400	0.010
L32	3.75 - 0 (32)	TP49.86x49.072x0.375	3.750	0.000	0.0	58.900	-38.579	3716.440	0.010

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Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	148 - 143 (1)	TP24x24x0.25	14.146	462.451	0.031	0.000	462.451	0.000
L2	143 - 138 (2)	TP24x24x0.25	41.290	462.451	0.089	0.000	462.451	0.000
L3	138 - 133 (3)	TP23.05x22x0.25	89.451	579.932	0.154	0.000	579.932	0.000
L4	133 - 128 (4)	TP24.1x23.05x0.25	136.977	634.888	0.216	0.000	634.888	0.000
L5	128 - 123 (5)	TP25.15x24.1x0.25	186.207	690.960	0.269	0.000	690.960	0.000
L6	123 - 118 (6)	TP26.201x25.15x0.25	250.458	743.160	0.337	0.000	743.160	0.000
L7	118 - 113 (7)	TP27.251x26.201x0.25	322.181	796.578	0.404	0.000	796.578	0.000
L8	113 - 108 (8)	TP28.301x27.251x0.25	395.635	851.142	0.465	0.000	851.142	0.000
L9	108 - 103 (9)	TP29.351x28.301x0.25	470.818	906.775	0.519	0.000	906.775	0.000
L10	103 - 98 (10)	TP30.401x29.351x0.25	547.725	963.392	0.569	0.000	963.392	0.000
L11	98 - 90.75 (11)	TP31.924x30.401x0.25	598.636	1000.700	0.598	0.000	1000.700	0.000
L12	90.75 - 89.75 (12)	TP31.634x30.584x0.313	678.421	1364.600	0.497	0.000	1364.600	0.000
L13	89.75 - 84.75 (13)	TP32.684x31.634x0.313	760.599	1446.258	0.526	0.000	1446.258	0.000
L14	84.75 - 79.75 (14)	TP33.735x32.684x0.313	844.550	1529.458	0.552	0.000	1529.458	0.000
L15	79.75 - 74.75 (15)	TP34.785x33.735x0.313	930.258	1614.100	0.576	0.000	1614.100	0.000
L16	74.75 - 74.5 (16)	TP34.837x34.785x0.313	934.600	1618.367	0.577	0.000	1618.367	0.000
L17	74.5 - 74.25 (17)	TP34.89x34.837x0.313	938.933	1622.642	0.579	0.000	1622.642	0.000
L18	74.25 - 69.25 (18)	TP35.94x34.89x0.313	1026.567	1708.800	0.601	0.000	1708.800	0.000
L19	69.25 - 64.25 (19)	TP36.99x35.94x0.313	1115.925	1796.258	0.621	0.000	1796.258	0.000
L20	64.25 - 59.25 (20)	TP38.04x36.99x0.313	1207.000	1884.925	0.640	0.000	1884.925	0.000
L21	59.25 - 54.25 (21)	TP39.091x38.04x0.313	1304.017	1974.742	0.660	0.000	1974.742	0.000
L22	54.25 - 44.75 (22)	TP41.086x39.091x0.313	1388.525	2051.933	0.677	0.000	2051.933	0.000
L23	44.75 - 43.75 (23)	TP40.671x39.358x0.375	1515.258	2664.742	0.569	0.000	2664.742	0.000
L24	43.75 - 38.75 (24)	TP41.721x40.671x0.375	1618.642	2786.767	0.581	0.000	2786.767	0.000
L25	38.75 - 33.75 (25)	TP42.771x41.721x0.375	1723.583	2910.450	0.592	0.000	2910.450	0.000
L26	33.75 - 28.75	TP43.822x42.771x0.375	1830.025	3035.708	0.603	0.000	3035.708	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L27	28.75 - 23.75 (27)	TP44.872x43.822x0.375	1937.908	3162.467	0.613	0.000	3162.467	0.000
L28	23.75 - 18.75 (28)	TP45.922x44.872x0.375	2047.233	3290.658	0.622	0.000	3290.658	0.000
L29	18.75 - 13.75 (29)	TP46.972x45.922x0.375	2158.008	3420.200	0.631	0.000	3420.200	0.000
L30	13.75 - 8.75 (30)	TP48.022x46.972x0.375	2270.242	3551.025	0.639	0.000	3551.025	0.000
L31	8.75 - 3.75 (31)	TP49.072x48.022x0.375	2383.942	3683.050	0.647	0.000	3683.050	0.000
L32	3.75 - 0 (32)	TP49.86x49.072x0.375	2470.175	3782.808	0.653	0.000	3782.808	0.000

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Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	148 - 143 (1)	TP24x24x0.25	5.275	201.861	0.026	0.000	324.229	0.000
L2	143 - 138 (2)	TP24x24x0.25	5.573	201.861	0.028	0.000	324.229	0.000
L3	138 - 133 (3)	TP23.05x22x0.25	9.339	293.089	0.032	0.145	572.455	0.000
L4	133 - 128 (4)	TP24.1x23.05x0.25	9.677	306.589	0.032	0.145	627.015	0.000
L5	128 - 123 (5)	TP25.15x24.1x0.25	10.021	320.088	0.031	0.145	684.058	0.000
L6	123 - 118 (6)	TP26.201x25.15x0.25	14.176	333.588	0.042	0.133	743.583	0.000
L7	118 - 113 (7)	TP27.251x26.201x0.25	14.524	347.087	0.042	0.133	805.592	0.000
L8	113 - 108 (8)	TP28.301x27.251x0.25	14.870	360.587	0.041	0.133	870.083	0.000
L9	108 - 103 (9)	TP29.351x28.301x0.25	15.217	374.086	0.041	0.133	937.058	0.000
L10	103 - 98 (10)	TP30.401x29.351x0.25	15.562	387.586	0.040	0.133	1006.517	0.000
L11	98 - 90.75 (11)	TP31.924x30.401x0.25	15.785	396.360	0.040	0.133	1053.000	0.000
L12	90.75 - 89.75 (12)	TP31.634x30.584x0.313	16.267	503.287	0.032	0.133	1353.100	0.000
L13	89.75 - 84.75 (13)	TP32.684x31.634x0.313	16.622	516.787	0.032	0.120	1446.308	0.000
L14	84.75 - 79.75 (14)	TP33.735x32.684x0.313	16.976	533.662	0.032	0.119	1542.617	0.000
L15	79.75 - 74.75 (15)	TP34.785x33.735x0.313	17.328	550.538	0.031	0.119	1642.025	0.000
L16	74.75 - 74.5 (16)	TP34.837x34.785x0.313	17.378	553.913	0.031	0.119	1647.083	0.000
L17	74.5 - 74.25 (17)	TP34.89x34.837x0.313	17.396	554.756	0.031	0.119	1652.142	0.000
L18	74.25 - 69.25 (18)	TP35.94x34.89x0.313	17.711	569.100	0.031	0.119	1754.967	0.000
L19	69.25 - 64.25 (19)	TP36.99x35.94x0.313	18.056	585.976	0.031	0.119	1860.900	0.000
L20	64.25 - 59.25 (20)	TP38.04x36.99x0.313	18.395	602.851	0.031	0.119	1969.933	0.000
L21	59.25 - 54.25 (21)	TP39.091x38.04x0.313	19.762	623.101	0.032	0.057	2082.075	0.000
L22	54.25 - 44.75 (22)	TP41.086x39.091x0.313	20.035	637.445	0.031	0.057	2179.842	0.000
L23	44.75 - 43.75 (23)	TP40.671x39.358x0.375	20.533	776.989	0.026	0.057	2691.133	0.000
L24	43.75 - 38.75 (24)	TP41.721x40.671x0.375	20.851	797.239	0.026	0.057	2834.583	0.000
L25	38.75 - 33.75 (25)	TP42.771x41.721x0.375	21.157	817.488	0.026	0.057	2981.758	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L26	33.75 - 28.75 (26)	TP43.822x42.771x0.375	21.448	837.738	0.026	0.057	3132.658	0.000
L27	28.75 - 23.75 (27)	TP44.872x43.822x0.375	21.736	857.987	0.025	0.057	3287.283	0.000
L28	23.75 - 18.75 (28)	TP45.922x44.872x0.375	22.025	878.237	0.025	0.057	3445.633	0.000
L29	18.75 - 13.75 (29)	TP46.972x45.922x0.375	22.316	898.486	0.025	0.057	3607.708	0.000
L30	13.75 - 8.75 (30)	TP48.022x46.972x0.375	22.608	918.736	0.025	0.057	3773.500	0.000
L31	8.75 - 3.75 (31)	TP49.072x48.022x0.375	22.902	938.985	0.024	0.057	3943.025	0.000
L32	3.75 - 0 (32)	TP49.86x49.072x0.375	23.126	954.172	0.024	0.057	4072.608	0.000

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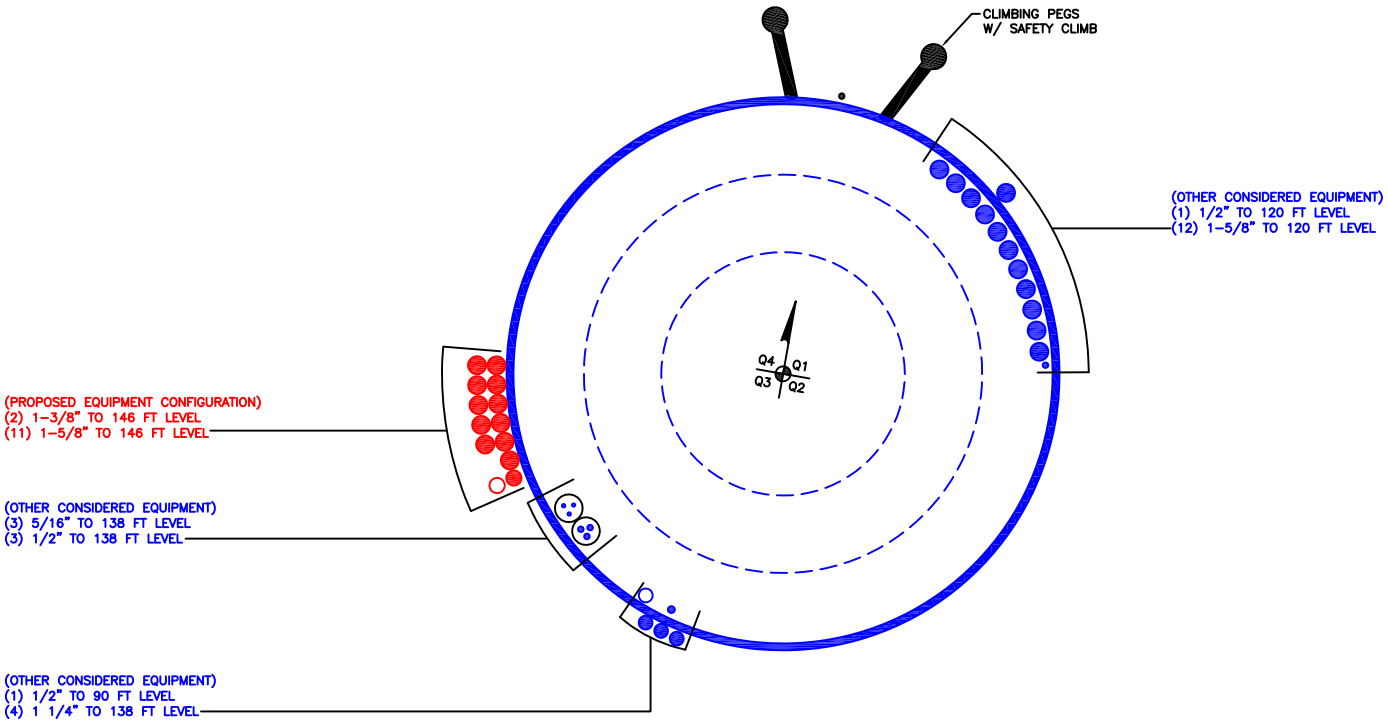
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 143 (1)	0.005	0.031	0.000	0.026	0.000	0.036 ✔	1.050	4.8.2 ✔
L2	143 - 138 (2)	0.005	0.089	0.000	0.028	0.000	0.095 ✔	1.050	4.8.2 ✔
L3	138 - 133 (3)	0.006	0.154	0.000	0.032	0.000	0.161 ✔	1.050	4.8.2 ✔
L4	133 - 128 (4)	0.006	0.216	0.000	0.032	0.000	0.222 ✔	1.050	4.8.2 ✔
L5	128 - 123 (5)	0.006	0.269	0.000	0.031	0.000	0.276 ✔	1.050	4.8.2 ✔
L6	123 - 118 (6)	0.008	0.337	0.000	0.042	0.000	0.347 ✔	1.050	4.8.2 ✔
L7	118 - 113 (7)	0.009	0.404	0.000	0.042	0.000	0.415 ✔	1.050	4.8.2 ✔
L8	113 - 108 (8)	0.009	0.465	0.000	0.041	0.000	0.475 ✔	1.050	4.8.2 ✔
L9	108 - 103 (9)	0.009	0.519	0.000	0.041	0.000	0.530 ✔	1.050	4.8.2 ✔
L10	103 - 98 (10)	0.009	0.569	0.000	0.040	0.000	0.579 ✔	1.050	4.8.2 ✔
L11	98 - 90.75 (11)	0.009	0.598	0.000	0.040	0.000	0.609 ✔	1.050	4.8.2 ✔
L12	90.75 - 89.75 (12)	0.008	0.497	0.000	0.032	0.000	0.506 ✔	1.050	4.8.2 ✔
L13	89.75 - 84.75 (13)	0.008	0.526	0.000	0.032	0.000	0.535 ✔	1.050	4.8.2 ✔
L14	84.75 - 79.75 (14)	0.008	0.552	0.000	0.032	0.000	0.561 ✔	1.050	4.8.2 ✔
L15	79.75 - 74.75 (15)	0.008	0.576	0.000	0.031	0.000	0.586 ✔	1.050	4.8.2 ✔
L16	74.75 - 74.5 (16)	0.008	0.577	0.000	0.031	0.000	0.587 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L17	74.5 - 74.25 (17)	0.008	0.579	0.000	0.031	0.000	0.588 ✔	1.050	4.8.2 ✔
L18	74.25 - 69.25 (18)	0.009	0.601	0.000	0.031	0.000	0.610 ✔	1.050	4.8.2 ✔
L19	69.25 - 64.25 (19)	0.009	0.621	0.000	0.031	0.000	0.631 ✔	1.050	4.8.2 ✔
L20	64.25 - 59.25 (20)	0.009	0.640	0.000	0.031	0.000	0.650 ✔	1.050	4.8.2 ✔
L21	59.25 - 54.25 (21)	0.009	0.660	0.000	0.032	0.000	0.671 ✔	1.050	4.8.2 ✔
L22	54.25 - 44.75 (22)	0.010	0.677	0.000	0.031	0.000	0.687 ✔	1.050	4.8.2 ✔
L23	44.75 - 43.75 (23)	0.008	0.569	0.000	0.026	0.000	0.578 ✔	1.050	4.8.2 ✔
L24	43.75 - 38.75 (24)	0.008	0.581	0.000	0.026	0.000	0.590 ✔	1.050	4.8.2 ✔
L25	38.75 - 33.75 (25)	0.009	0.592	0.000	0.026	0.000	0.602 ✔	1.050	4.8.2 ✔
L26	33.75 - 28.75 (26)	0.009	0.603	0.000	0.026	0.000	0.612 ✔	1.050	4.8.2 ✔
L27	28.75 - 23.75 (27)	0.009	0.613	0.000	0.025	0.000	0.623 ✔	1.050	4.8.2 ✔
L28	23.75 - 18.75 (28)	0.009	0.622	0.000	0.025	0.000	0.632 ✔	1.050	4.8.2 ✔
L29	18.75 - 13.75 (29)	0.010	0.631	0.000	0.025	0.000	0.641 ✔	1.050	4.8.2 ✔
L30	13.75 - 8.75 (30)	0.010	0.639	0.000	0.025	0.000	0.650 ✔	1.050	4.8.2 ✔
L31	8.75 - 3.75 (31)	0.010	0.647	0.000	0.024	0.000	0.658 ✔	1.050	4.8.2 ✔
L32	3.75 - 0 (32)	0.010	0.653	0.000	0.024	0.000	0.664 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	148 - 143	Pole	TP24x24x0.25	1	-3.451	791.514	**	**
L2	143 - 138	Pole	TP24x24x0.25	2	-3.848	791.514	**	**
L3	138 - 133	Pole	TP23.05x22x0.25	3	-6.940	1302.777	**	**
L4	133 - 128	Pole	TP24.1x23.05x0.25	4	-7.423	1362.784	**	**
L5	128 - 123	Pole	TP25.15x24.1x0.25	5	-7.929	1419.978	**	**
L6	123 - 118	Pole	TP26.201x25.15x0.25	6	-11.644	1464.855	**	**
L7	118 - 113	Pole	TP27.251x26.201x0.25	7	-12.310	1508.524	**	**
L8	113 - 108	Pole	TP28.301x27.251x0.25	8	-13.001	1550.976	**	**
L9	108 - 103	Pole	TP29.351x28.301x0.25	9	-13.716	1592.209	**	**
L10	103 - 98	Pole	TP30.401x29.351x0.25	10	-14.456	1632.235	**	**
L11	98 - 90.75	Pole	TP31.924x30.401x0.25	11	-14.948	1657.593	**	**
L12	90.75 - 89.75	Pole	TP31.634x30.584x0.313	12	-16.288	2229.307	**	**
L13	89.75 - 84.75	Pole	TP32.684x31.634x0.313	13	-17.195	2285.335	**	**
L14	84.75 - 79.75	Pole	TP33.735x32.684x0.313	14	-18.127	2340.145	**	**
L15	79.75 - 74.75	Pole	TP34.785x33.735x0.313	15	-19.084	2393.737	**	**
L16	74.75 - 74.5	Pole	TP34.837x34.785x0.313	16	-19.139	2396.394	**	**
L17	74.5 - 74.25	Pole	TP34.89x34.837x0.313	17	-19.187	2399.040	**	**
L18	74.25 - 69.25	Pole	TP35.94x34.89x0.313	18	-20.166	2451.298	**	**
L19	69.25 - 64.25	Pole	TP36.99x35.94x0.313	19	-21.174	2502.349	**	**
L20	64.25 - 59.25	Pole	TP38.04x36.99x0.313	20	-22.207	2552.182	**	**
L21	59.25 - 54.25	Pole	TP39.091x38.04x0.313	21	-23.213	2600.797	**	**
L22	54.25 - 44.75	Pole	TP41.086x39.091x0.313	22	-24.134	2641.170	**	**
L23	44.75 - 43.75	Pole	TP40.671x39.358x0.375	23	-26.506	3381.525	**	**
L24	43.75 - 38.75	Pole	TP41.721x40.671x0.375	24	-27.782	3445.743	**	**
L25	38.75 - 33.75	Pole	TP42.771x41.721x0.375	25	-29.084	3508.753	**	**
L26	33.75 - 28.75	Pole	TP43.822x42.771x0.375	26	-30.414	3570.535	**	**
L27	28.75 - 23.75	Pole	TP44.872x43.822x0.375	27	-31.771	3631.120	**	**
L28	23.75 - 18.75	Pole	TP45.922x44.872x0.375	28	-33.155	3690.477	**	**
L29	18.75 - 13.75	Pole	TP46.972x45.922x0.375	29	-34.565	3748.626	**	**
L30	13.75 - 8.75	Pole	TP48.022x46.972x0.375	30	-36.002	3805.557	**	**
L31	8.75 - 3.75	Pole	TP49.072x48.022x0.375	31	-37.465	3861.270	**	**
L32	3.75 - 0	Pole	TP49.86x49.072x0.375	32	-38.579	3902.262	**	**
							Summary	
						Pole (L22)	**	**
						RATING =	**	**

**Check Additional Calculation



BUSINESS UNIT: 876323

CCIpole

per TIA-222- H

Site BU: 876323

Work Order: 1642329

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	148	10	0	0	24	24	0.25		A500-50
2	138	47.25	4	18	22.00	31.924	0.25	Auto	A607-60
3	94.75	50	5.25	18	30.58	41.086	0.3125	Auto	A607-60
4	50	50	0	18	39.36	49.86	0.375	Auto	A607-60

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	47.5	74.5	plate	CCI-SFP-045100	3				E						E						E		
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65

TNX Geometry Input

□□□r□□ □□□□□□□□□ 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	148 - 143	5		0	24.000	24.000	0.25	A500-50	1.000
2	143 - 138	5	0	0	24.000	24.000	0.25	A500-50	1.000
3	138 - 133	5		18	22.000	23.050	0.25	A607-60	1.000
4	133 - 128	5		18	23.050	24.100	0.25	A607-60	1.000
5	128 - 123	5		18	24.100	25.150	0.25	A607-60	1.000
6	123 - 118	5		18	25.150	26.201	0.25	A607-60	1.000
7	118 - 113	5		18	26.201	27.251	0.25	A607-60	1.000
8	113 - 108	5		18	27.251	28.301	0.25	A607-60	1.000
9	108 - 103	5		18	28.301	29.351	0.25	A607-60	1.000
10	103 - 98	5		18	29.351	30.401	0.25	A607-60	1.000
11	98 - 94.75	7.25	4	18	30.401	31.924	0.25	A607-60	1.000
12	94.75 - 89.75	5		18	30.584	31.634	0.3125	A607-60	1.000
13	89.75 - 84.75	5		18	31.634	32.684	0.3125	A607-60	1.000
14	84.75 - 79.75	5		18	32.684	33.735	0.3125	A607-60	1.000
15	79.75 - 74.75	5		18	33.735	34.785	0.3125	A607-60	1.000
16	74.75 - 74.5	0.25		18	34.785	34.837	0.3125	A607-60	1.000
17	74.5 - 74.25	0.25		18	34.837	34.890	0.3125	A607-60	1.000
18	74.25 - 69.25	5		18	34.890	35.940	0.3125	A607-60	1.000
19	69.25 - 64.25	5		18	35.940	36.990	0.3125	A607-60	1.000
20	64.25 - 59.25	5		18	36.990	38.040	0.3125	A607-60	1.000
21	59.25 - 54.25	5		18	38.040	39.091	0.3125	A607-60	1.000
22	54.25 - 50	9.5	5.25	18	39.091	41.086	0.3125	A607-60	1.000
23	50 - 43.75	6.25		18	39.358	40.671	0.375	A607-60	1.000
24	43.75 - 38.75	5		18	40.671	41.721	0.375	A607-60	1.000
25	38.75 - 33.75	5		18	41.721	42.771	0.375	A607-60	1.000
26	33.75 - 28.75	5		18	42.771	43.822	0.375	A607-60	1.000
27	28.75 - 23.75	5		18	43.822	44.872	0.375	A607-60	1.000
28	23.75 - 18.75	5		18	44.872	45.922	0.375	A607-60	1.000
29	18.75 - 13.75	5		18	45.922	46.972	0.375	A607-60	1.000
30	13.75 - 8.75	5		18	46.972	48.022	0.375	A607-60	1.000
31	8.75 - 3.75	5		18	48.022	49.072	0.375	A607-60	1.000
32	3.75 - 0	3.75		18	49.072	49.860	0.375	A607-60	1.000

TNX Section Forces

	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	148 - 143	3.45	14.15	5.28
2	143 - 138	3.85	41.29	5.57
3	138 - 133	6.94	89.45	9.34
4	133 - 128	7.42	136.98	9.68
5	128 - 123	7.93	186.21	10.02
6	123 - 118	11.64	250.46	14.18
7	118 - 113	12.31	322.18	14.52
8	113 - 108	13.00	395.64	14.87
9	108 - 103	13.72	470.82	15.22
10	103 - 98	14.46	547.72	15.56
11	98 - 94.75	14.95	598.64	15.78
12	94.75 - 89.75	16.29	678.42	16.27
13	89.75 - 84.75	17.20	760.60	16.62
14	84.75 - 79.75	18.13	844.55	16.98
15	79.75 - 74.75	19.08	930.26	17.33
16	74.75 - 74.5	19.14	934.60	17.38
17	74.5 - 74.25	19.19	938.93	17.40
18	74.25 - 69.25	20.17	1026.56	17.71
19	69.25 - 64.25	21.17	1115.93	18.06
20	64.25 - 59.25	22.21	1207.00	18.40
21	59.25 - 54.25	23.21	1304.02	19.76
22	54.25 - 50	24.13	1388.52	20.04
23	50 - 43.75	26.51	1515.26	20.53
24	43.75 - 38.75	27.78	1618.64	20.85
25	38.75 - 33.75	29.08	1723.59	21.16
26	33.75 - 28.75	30.41	1830.02	21.45
27	28.75 - 23.75	31.77	1937.90	21.74
28	23.75 - 18.75	33.15	2047.23	22.03
29	18.75 - 13.75	34.56	2158.01	22.32
30	13.75 - 8.75	36.00	2270.24	22.61
31	8.75 - 3.75	37.47	2383.94	22.90
32	3.75 - 0	38.58	2470.18	23.13

Analysis Results

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
148 - 143	Pole	TP24x24x0.25	Pole	3.4%	Pass
143 - 138	Pole	TP24x24x0.25	Pole	9.0%	Pass
138 - 133	Pole	TP23.05x22x0.25	Pole	15.2%	Pass
133 - 128	Pole	TP24.1x23.05x0.25	Pole	21.1%	Pass
128 - 123	Pole	TP25.15x24.1x0.25	Pole	26.2%	Pass
123 - 118	Pole	TP26.201x25.15x0.25	Pole	32.9%	Pass
118 - 113	Pole	TP27.251x26.201x0.25	Pole	39.4%	Pass
113 - 108	Pole	TP28.301x27.251x0.25	Pole	45.1%	Pass
108 - 103	Pole	TP29.351x28.301x0.25	Pole	50.4%	Pass
103 - 98	Pole	TP30.401x29.351x0.25	Pole	55.1%	Pass
98 - 94.75	Pole	TP31.924x30.401x0.25	Pole	57.9%	Pass
94.75 - 89.75	Pole	TP31.634x30.584x0.3125	Pole	48.1%	Pass
89.75 - 84.75	Pole	TP32.684x31.634x0.3125	Pole	50.9%	Pass
84.75 - 79.75	Pole	TP33.735x32.684x0.3125	Pole	53.4%	Pass
79.75 - 74.75	Pole	TP34.785x33.735x0.3125	Pole	55.7%	Pass
74.75 - 74.5	Pole	TP34.837x34.785x0.3125	Pole	55.8%	Pass
74.5 - 74.25	Pole	TP34.89x34.837x0.3125	Pole	55.9%	Pass
74.25 - 69.25	Pole	TP35.94x34.89x0.3125	Pole	58.1%	Pass
69.25 - 64.25	Pole	TP36.99x35.94x0.3125	Pole	60.0%	Pass
64.25 - 59.25	Pole	TP38.04x36.99x0.3125	Pole	61.9%	Pass
59.25 - 54.25	Pole	TP39.091x38.04x0.3125	Pole	63.8%	Pass
54.25 - 50	Pole	TP41.086x39.091x0.3125	Pole	65.4%	Pass
50 - 43.75	Pole	TP40.671x39.358x0.375	Pole	55.0%	Pass
43.75 - 38.75	Pole	TP41.721x40.671x0.375	Pole	56.1%	Pass
38.75 - 33.75	Pole	TP42.771x41.721x0.375	Pole	57.2%	Pass
33.75 - 28.75	Pole	TP43.822x42.771x0.375	Pole	58.3%	Pass
28.75 - 23.75	Pole	TP44.872x43.822x0.375	Pole	59.3%	Pass
23.75 - 18.75	Pole	TP45.922x44.872x0.375	Pole	60.2%	Pass
18.75 - 13.75	Pole	TP46.972x45.922x0.375	Pole	61.0%	Pass
13.75 - 8.75	Pole	TP48.022x46.972x0.375	Pole	61.9%	Pass
8.75 - 3.75	Pole	TP49.072x48.022x0.375	Pole	62.6%	Pass
3.75 - 0	Pole	TP49.86x49.072x0.375	Pole	63.2%	Pass
				Summary	
			Pole	65.4%	Pass
			Reinforcement	0.0%	Pass
			Overall	65.4%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*	
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1
148 - 143	1315	n/a	1315	18.65	n/a	18.65		
143 - 138	1315	n/a	1315	18.65	n/a	18.65		
138 - 133	1188	n/a	1188	18.09	n/a	18.09		
133 - 128	1360	n/a	1360	18.92	n/a	18.92		
128 - 123	1547	n/a	1547	19.76	n/a	19.76		
123 - 118	1751	n/a	1751	20.59	n/a	20.59		
118 - 113	1973	n/a	1973	21.42	n/a	21.42		
113 - 108	2212	n/a	2212	22.26	n/a	22.26		
108 - 103	2470	n/a	2470	23.09	n/a	23.09		
103 - 98	2747	n/a	2747	23.92	n/a	23.92		
98 - 94.75	2938	n/a	2938	24.47	n/a	24.47		
94.75 - 89.75	3849	n/a	3849	31.07	n/a	31.07		
89.75 - 84.75	4250	n/a	4250	32.11	n/a	32.11		
84.75 - 79.75	4677	n/a	4677	33.15	n/a	33.15		
79.75 - 74.75	5132	n/a	5132	34.19	n/a	34.19		
74.75 - 74.5	5155	n/a	5155	34.24	n/a	34.24		
74.5 - 74.25	5179	n/a	5179	34.30	n/a	34.30		
74.25 - 69.25	5665	n/a	5665	35.34	n/a	35.34		
69.25 - 64.25	6181	n/a	6181	36.38	n/a	36.38		
64.25 - 59.25	6727	n/a	6727	37.42	n/a	37.42		
59.25 - 54.25	7305	n/a	7305	38.46	n/a	38.46		
54.25 - 50	7821	n/a	7821	39.35	n/a	39.35		
50 - 43.75	9836	n/a	9836	47.96	n/a	47.96		
43.75 - 38.75	10625	n/a	10625	49.21	n/a	49.21		
38.75 - 33.75	11455	n/a	11455	50.46	n/a	50.46		
33.75 - 28.75	12328	n/a	12328	51.71	n/a	51.71		
28.75 - 23.75	13244	n/a	13244	52.96	n/a	52.96		
23.75 - 18.75	14203	n/a	14203	54.21	n/a	54.21		
18.75 - 13.75	15209	n/a	15209	55.46	n/a	55.46		
13.75 - 8.75	16260	n/a	16260	56.71	n/a	56.71		
8.75 - 3.75	17359	n/a	17359	57.96	n/a	57.96		
3.75 - 0	18215	n/a	18215	58.90	n/a	58.90		

Note: Section capacity checked in 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Flange Plate Connection

Elevation = 138 ft.

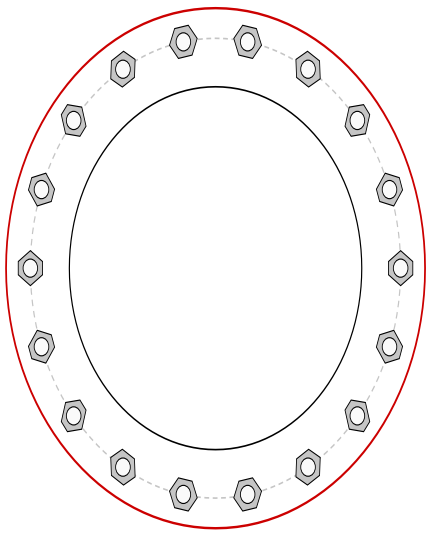
BU #	876323
Site Name	Hillside, CT
Order #	443729 Rev# 0

TIA-222 Revision	H

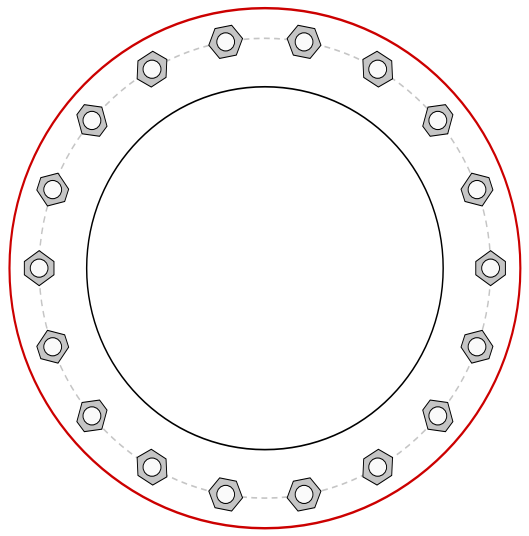
Applied Loads	
Moment (kip-ft)	41.29
Axial Force (kips)	3.85
Shear Force (kips)	5.57

**TIA-222-H Section 15.5 Applied*

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

(18) 3/4" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 19" BC

Top Plate Data

15" ID x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Bottom Plate Data

15" ID x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

22" x 0.25" round pole (A500-50; Fy=50 ksi, Fu=62 ksi)

Bottom Pole Data

22" x 0.25" 18-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	5.58	
Allowable (kips)	30.06	
Stress Rating:	**17.7%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	14.23	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**30.1%**	**Pass**
Tension Side Stress Rating:	**8.4%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	14.08	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**29.8%**	**Pass**
Tension Side Stress Rating:	**8.4%**	**Pass**

Monopole Flange Plate Connection

Elevation = 138 ft.

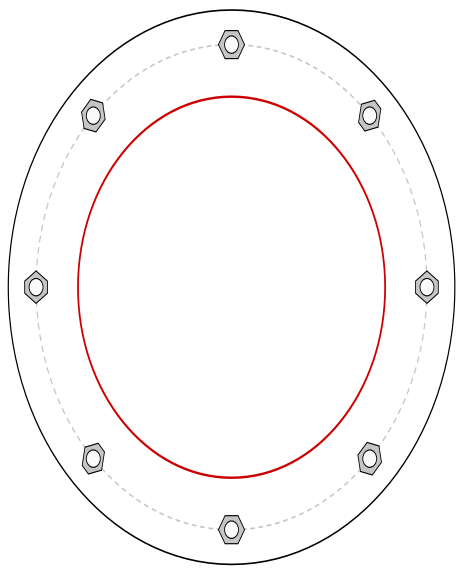
BU #	876323
Site Name	Hillside, CT
Order #	443729 Rev# 0

TIA-222 Revision	H

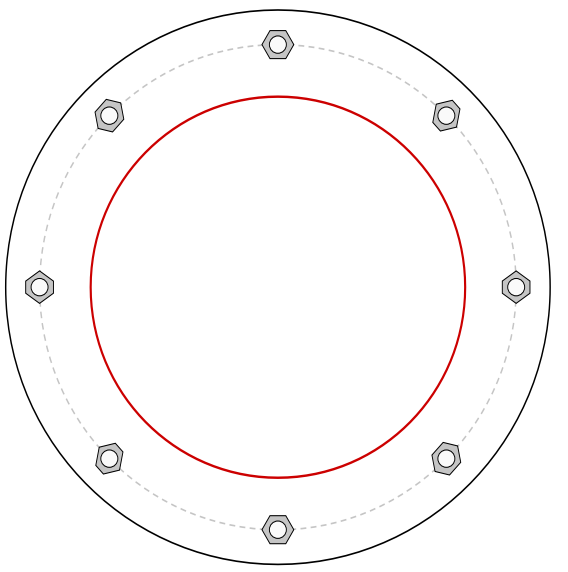
Applied Loads	
Moment (kip-ft)	41.29
Axial Force (kips)	3.85
Shear Force (kips)	5.57

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(8) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 28" BC

Top Plate Data

32" OD x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Bottom Plate Data

32" OD x 0.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

22" x 0.25" round pole (A500-50; Fy=50 ksi, Fu=62 ksi)

Bottom Pole Data

22" x 0.25" 18-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	8.36	
Allowable (kips)	54.53	
Stress Rating:	**14.6%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	13.74	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**29.1%**	**Pass**
Tension Side Stress Rating:	**14.9%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	13.74	(Flexural)
Allowable Stress (ksi):	45.00	
Stress Rating:	**29.1%**	**Pass**
Tension Side Stress Rating:	**14.9%**	**Pass**

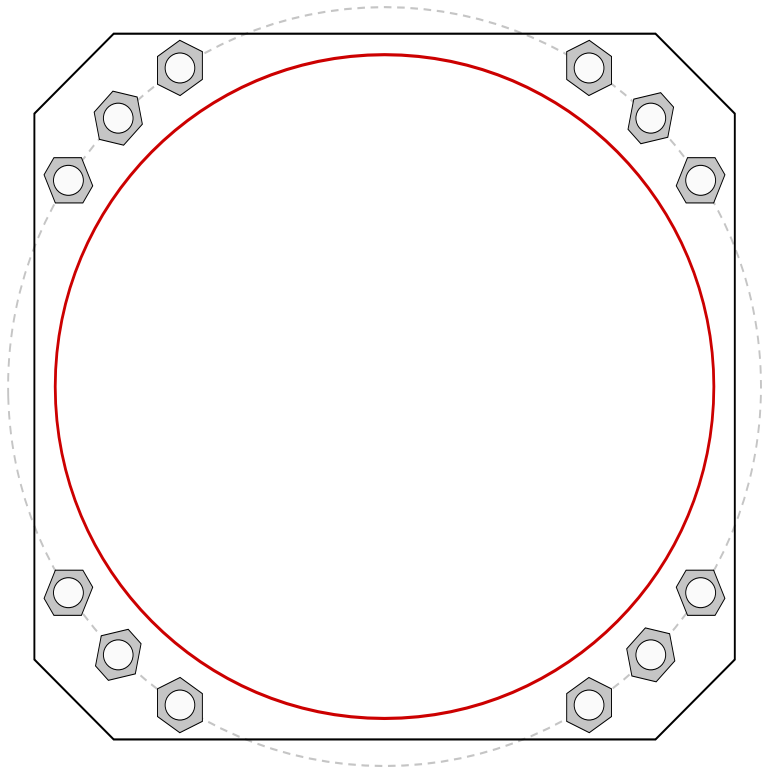
Monopole Base Plate Connection

Site Info	
BU #	876323
Site Name	Hillside, CT
Order #	443729 Rev# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	2470.00
Axial Force (kips)	39.00
Shear Force (kips)	23.00

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 57" BC

Base Plate Data

53" OD x 3" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

49.86" x 0.375" 18-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

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

Pu_c = 176.47	ϕPn_c = 243.75	**Stress Rating**
Vu = 1.92	ϕVn = 73.13	**69.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	29.13	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**51.4%**	**Pass**

Drilled Pier Foundation

BU # :	876323
Site Name:	Hillside, CT
Order Number:	443729 Rev# 0

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	2470	
Axial Force (kips)	39	
Shear Force (kips)	23	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	21.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 21.5' below grade		
Pier Diameter	7	ft
Rebar Quantity	38	
Rebar Size	9	
Clear Cover to Ties	4	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.79	-
Soil Safety Factor	2.81	-
Max Moment (kip-ft)	2625.02	-
Rating*	*45.0%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	310.49	-
End Bearing (kips)	337.70	-
Weight of Concrete (kips)	104.85	-
Total Capacity (kips)	648.19	-
Axial (kips)	143.85	-
Rating*	*21.1%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	5.79	-
Critical Moment (kip-ft)	2625.02	-
Critical Moment Capacity	5924.44	-
Rating*	*42.2%*	-

Soil Interaction Rating*	**45.0%**
Structural Foundation Rating*	**42.2%**

Check Limitation	
Apply TIA-222-H Section 15.5:	☑

*Rating per TIA-222-H Section 15.5

Soil Profile

Groundwater Depth	5	ft	# of Layers: 6

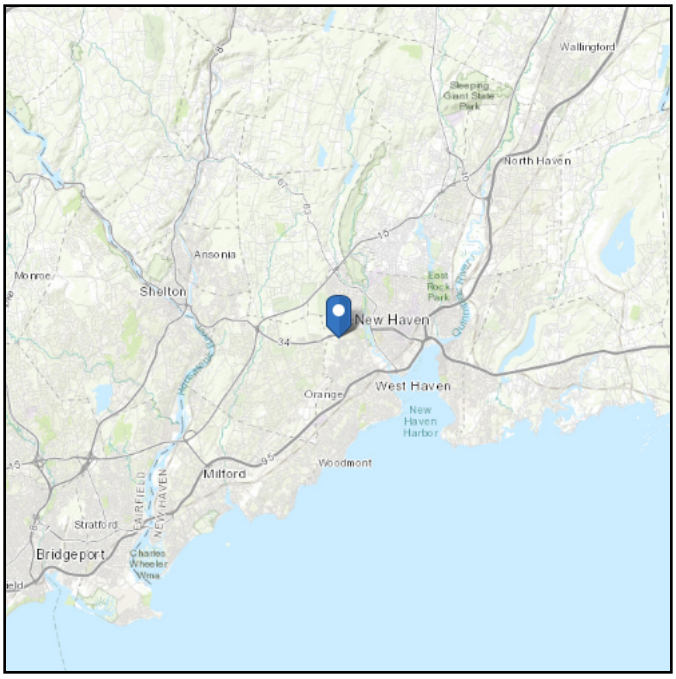
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	115	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	5	1.5	115	150	0	31	0.000	0.000	0.00	0.00			Cohesionless
3	5	8	3	68	87.6	0	40	0.000	0.000	0.81	0.81			Cohesionless
4	8	15	7	68	87.6	0	42	0.000	0.000	1.07	1.07			Cohesionless
5	15	20	5	68	87.6	0	42	0.000	0.000	1.34	1.34			Cohesionless
6	20	21.5	1.5	68	87.6	0	42	0.000	0.000	1.47	1.47	11.7		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 157.22 ft (NAVD 88)
Latitude: 41.301275
Longitude: -72.976444



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Oct 03 2018

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

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

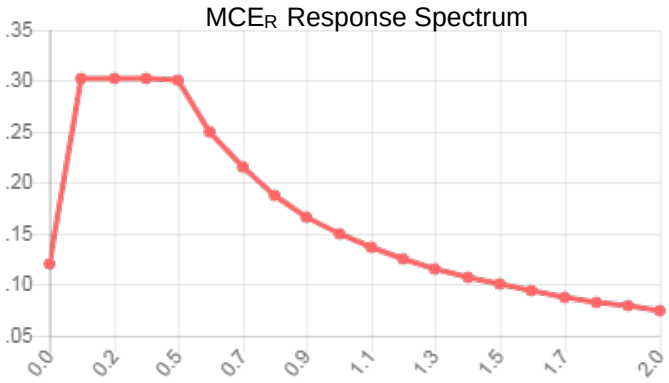
Seismic

Site Soil Class: D - Stiff Soil

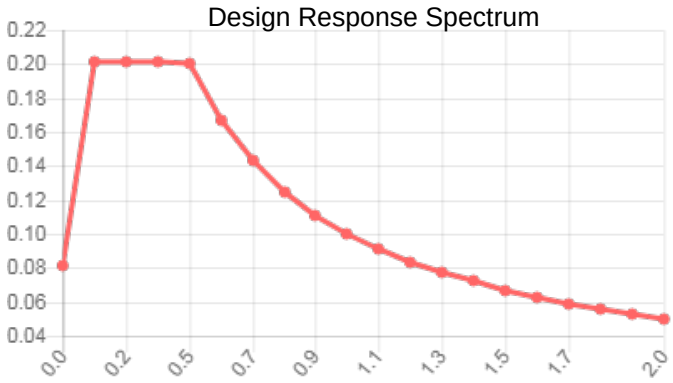
Results:

S_S :	0.189	S_{DS} :	0.201
S_1 :	0.063	S_{D1} :	0.100
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.099
S_{MS} :	0.302	PGA_M :	0.159
S_{M1} :	0.150	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B



S_a(g) vs T(s)



S_a(g) vs T(s)

Data Accessed: Wed Oct 03 2018

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Oct 03 2018

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

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

Date: **September 28, 2018**

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300,
Charlotte, NC 28277
(704) 405-6607

Tectonic
1279 Route 300
Newburgh, NY 12550
(845) -567-6656

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**Metro PCS Equipment Change-Out**	
	Carrier Site Number:	N/A
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	876323
	Crown Castle Site Name:	Hillside
	Crown Castle JDE Job Number:	509417
	Crown Castle Order Number:	443729 Rev 0
Engineering Firm Designation:	**Tectonic Project Number:**	9500.876323
Site Data:	**85 Plainfield Ave, West Haven, New Haven County, CT 06516**	
	Latitude 41° 18' 4.59" Longitude -72° 58' 35.20"	
Structure Information:	**Tower Height & Type:**	**148 ft MP**
	Mount Elevation:	**146 ft**
	Mount Type:	**12.5 ft Platform**

Dear Charles,

Tectonic Engineering & Surveying Consultants P.C. (Tectonic) is pleased to submit this **"Mount Replacement Analysis Report"** to determine the structural integrity of Metro PCS's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore, is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient**

This analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from 2016 Connecticut State Building Code (2015 IBC). Exposure Category B with a maximum topographic factor, Kzt, of 1.00 and Risk Category II were used in this analysis.

Mount structural analysis prepared by: Swati Gandhi \ KZ

Respectfully Submitted by:

STATE OF CONNECTICUT ANTONIO A. GUALTIERI No. 25406 PROFESSIONAL ENGINEER

9/28/18

Antonia A. Gualtieri, P.E.
Sr. Vice President

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a proposed 12.5' wide Low Profile Platform (PN #RMQP-496-HK) manufactured by SitePro1. It is to be installed at the 146 ft elevation of the 148 ft existing Monopole tower.

2) ANALYSIS CRITERIA

Building Code: 2015 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 125 mph
Exposure Category: B
Topographic Category at Base: 1
Topographic Category at Mount: 1
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Live Loading Wind Speed: 30 mph
Live Loading at Mid/End-Points: 250 lbs
Man Live Loading at Mount Pipes: 500 lbs

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type
146	146	3	Ericsson	AIR -32 B2A/B66AA	SitePro1 (PN # RMQP-496-HK) Platform
		3	RFS/Celwave	APX16DWV-16DWVS-E-A20	
	144	3	RFS/Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER STRUCTURAL ANALYSIS REPORTS	Paul J. Ford & Company	6789296	CCISITES
MOUNT ASSEMBLY DRAWINGS (RMQP-3XX) WITH HANDRAIL (PN # HRK12)	SitePro1	-	ONFILE

3.1) Analysis Method

RISA-3D (17.0.0), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Proprietary excel sheets were used to calculate appurtenance and member loading for various load cases. Selected output from the analysis is included in Appendix B

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Horizontal	1	146	13	Pass
	Top Rail	37		20	Pass
	Grating Support	13		43	Pass
	Cross Arm	7		18	Pass
	Support Arm	4		41	
	Mount Pipe	64		62	Pass
1,2	Mount to Tower Connection	-		13	Pass

Structure Rating (max from all components) =	62%

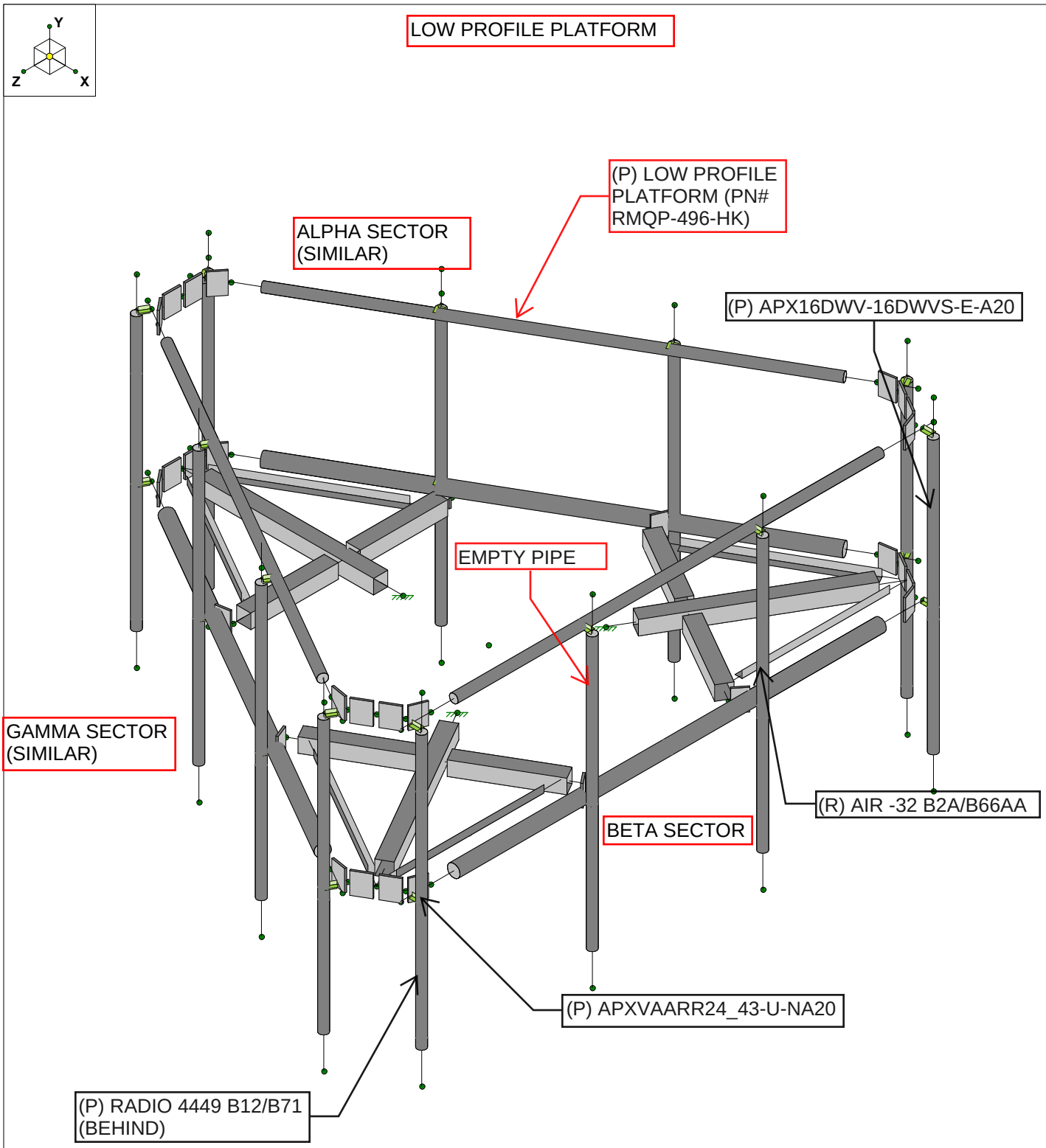
Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The proposed mount has sufficient capacity to support the proposed loading configuration. No modifications are required at this time.

APPENDIX A

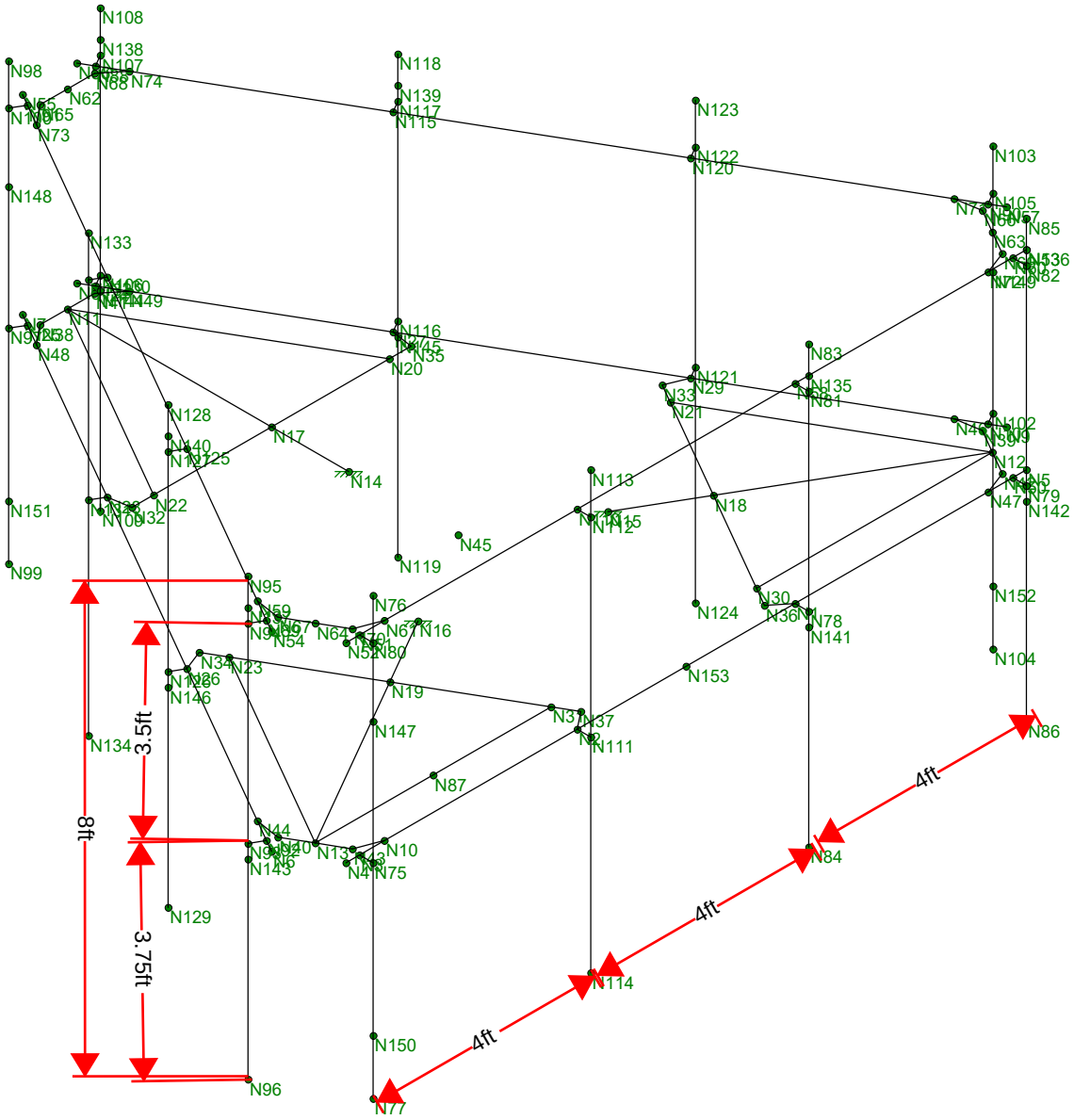
WIRE FRAME AND RENDERED MODELS



(R) RELOCATED
(P) PROPOSED)

NOTE:
THE MOUNT PIPES AND ANTENNAS ARE TO BE SPACED WITH MAX DISTANCE, NOT TO EXCEED 4 FT.

Tectonic	Platform	SK - 1
SG		Sept 28, 2018 at 4:16 PM
9500.876323		9500.876323 Mount Analysis.r3d



Tectonic	Platform	SK - 2
SG		Sept 28, 2018 at 4:16 PM
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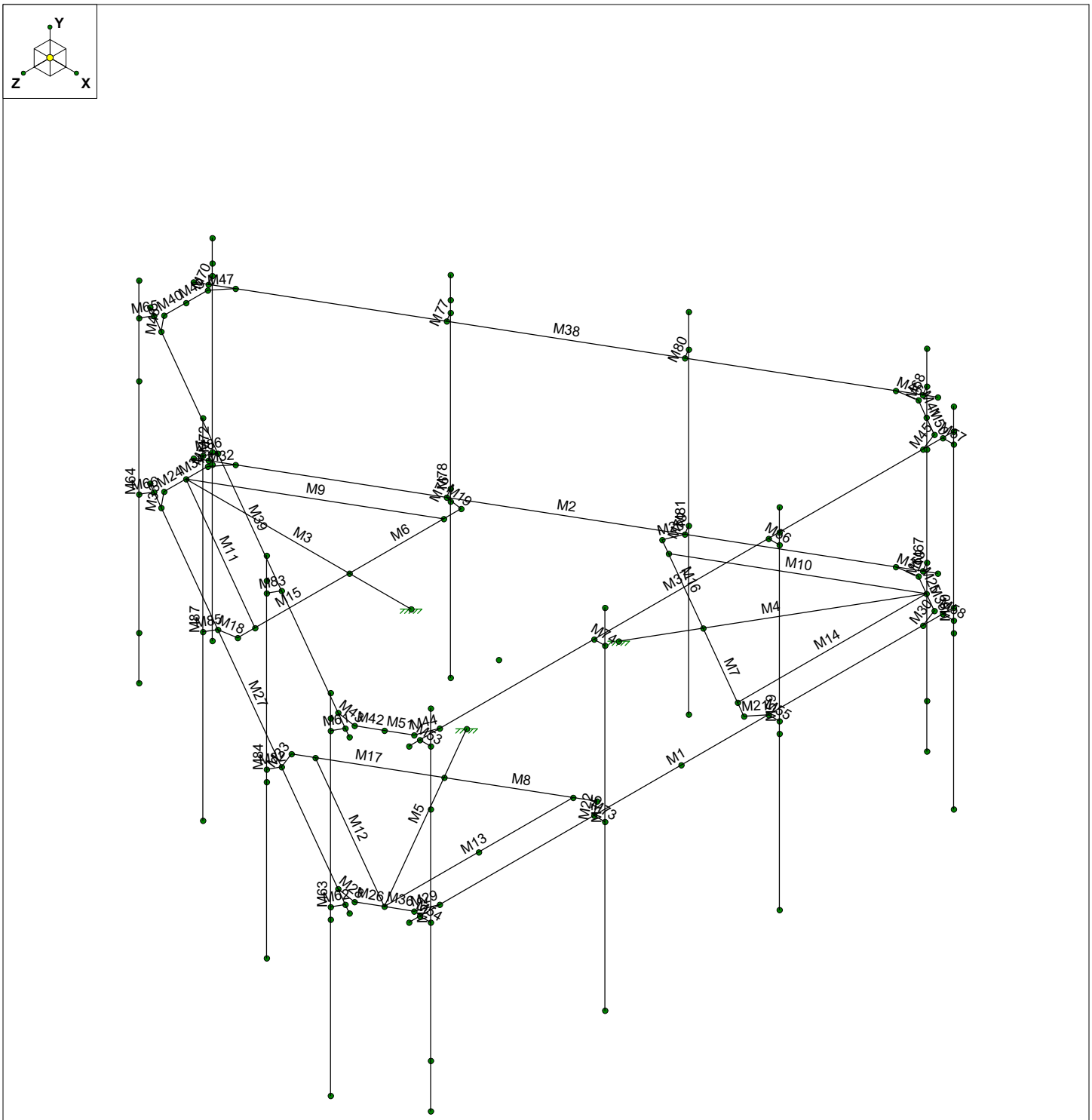
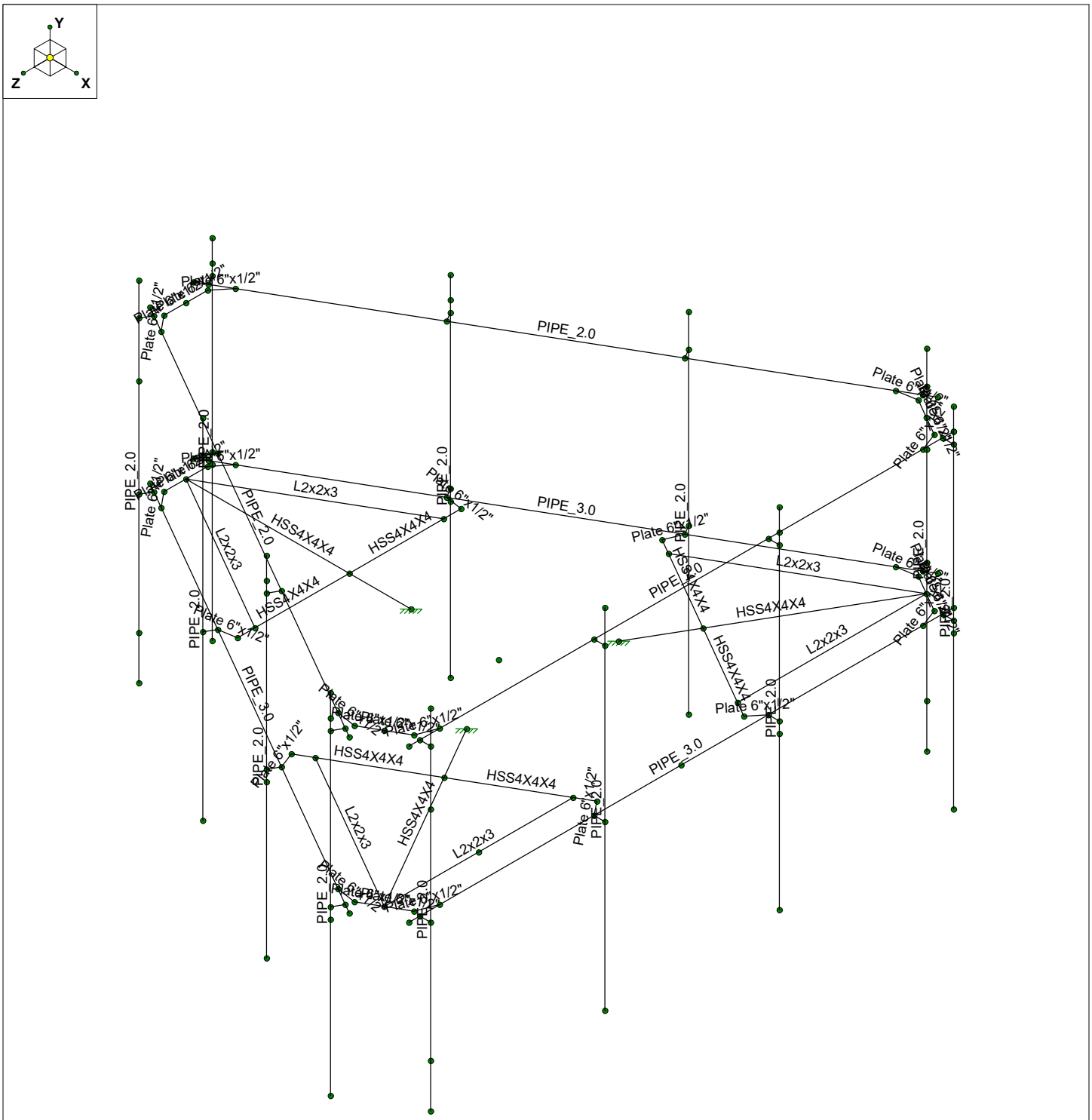


Tectonic	Platform	SK - 3
SG		Sept 28, 2018 at 4:16 PM
9500.876323		9500.876323 Mount Analysis.r3d



Tectonic	Platform	SK - 4
SG		Sept 28, 2018 at 4:16 PM
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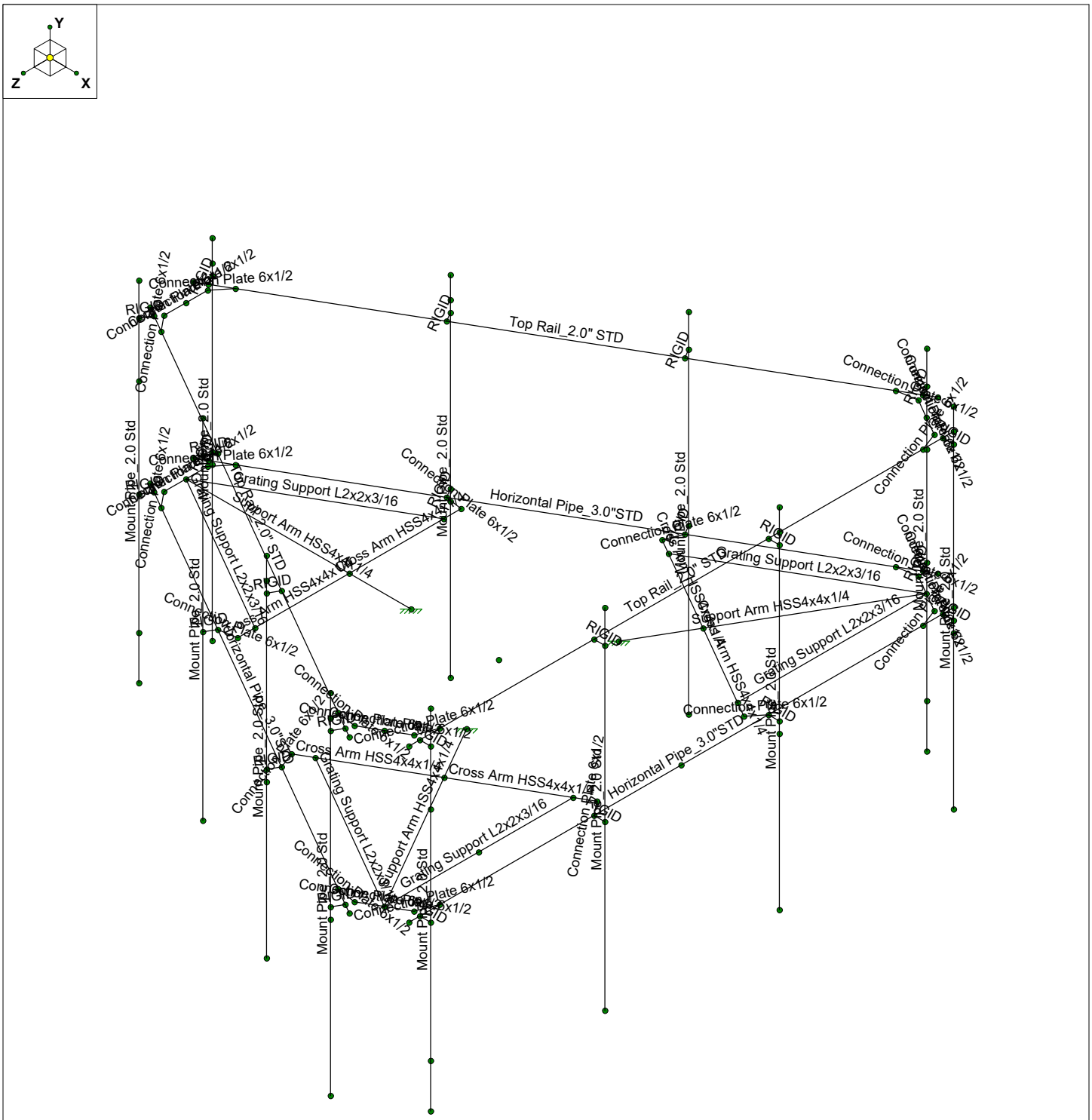

Tectonic	Platform	SK - 5
SG		Sept 28, 2018 at 4:21 PM
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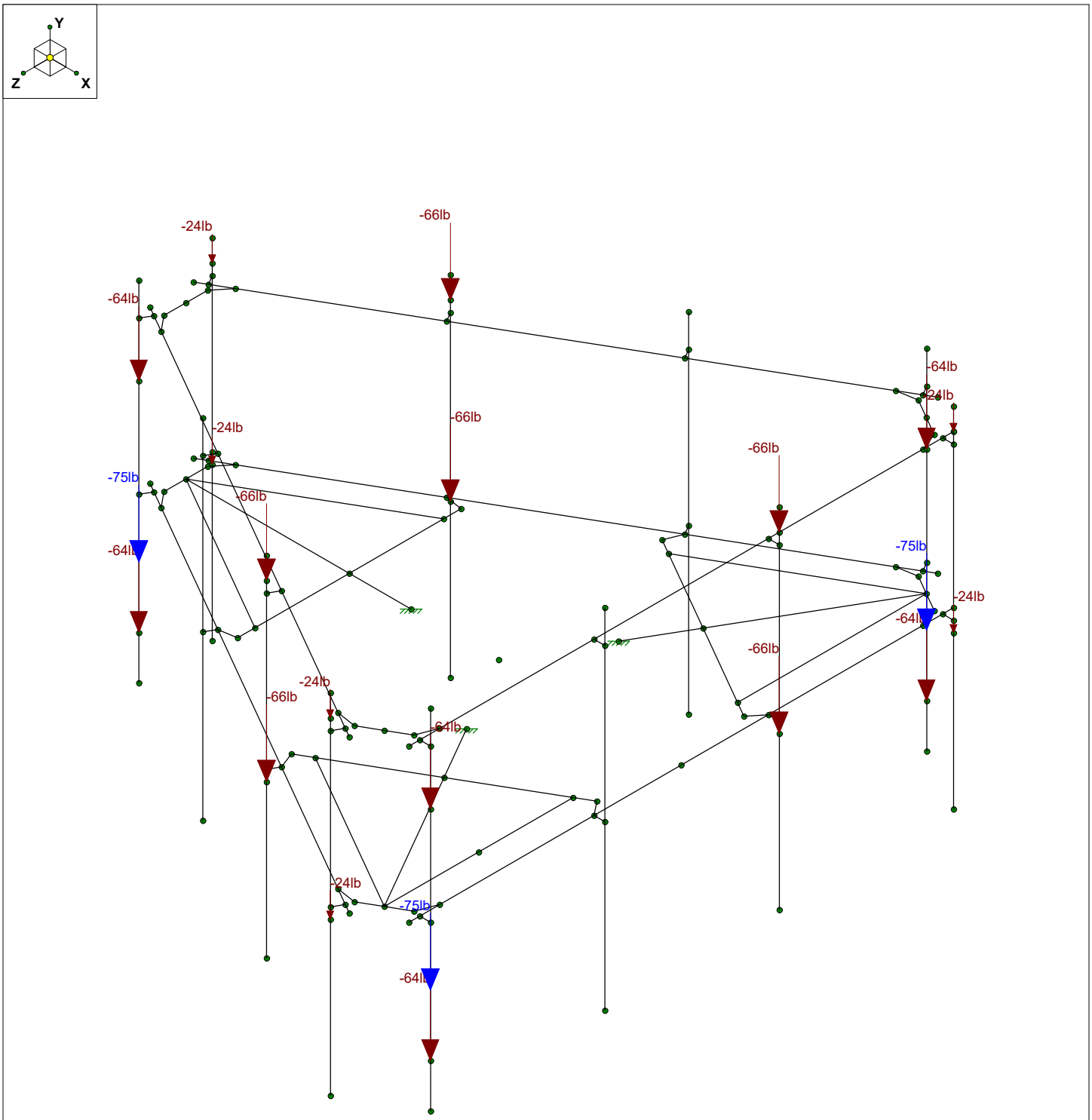
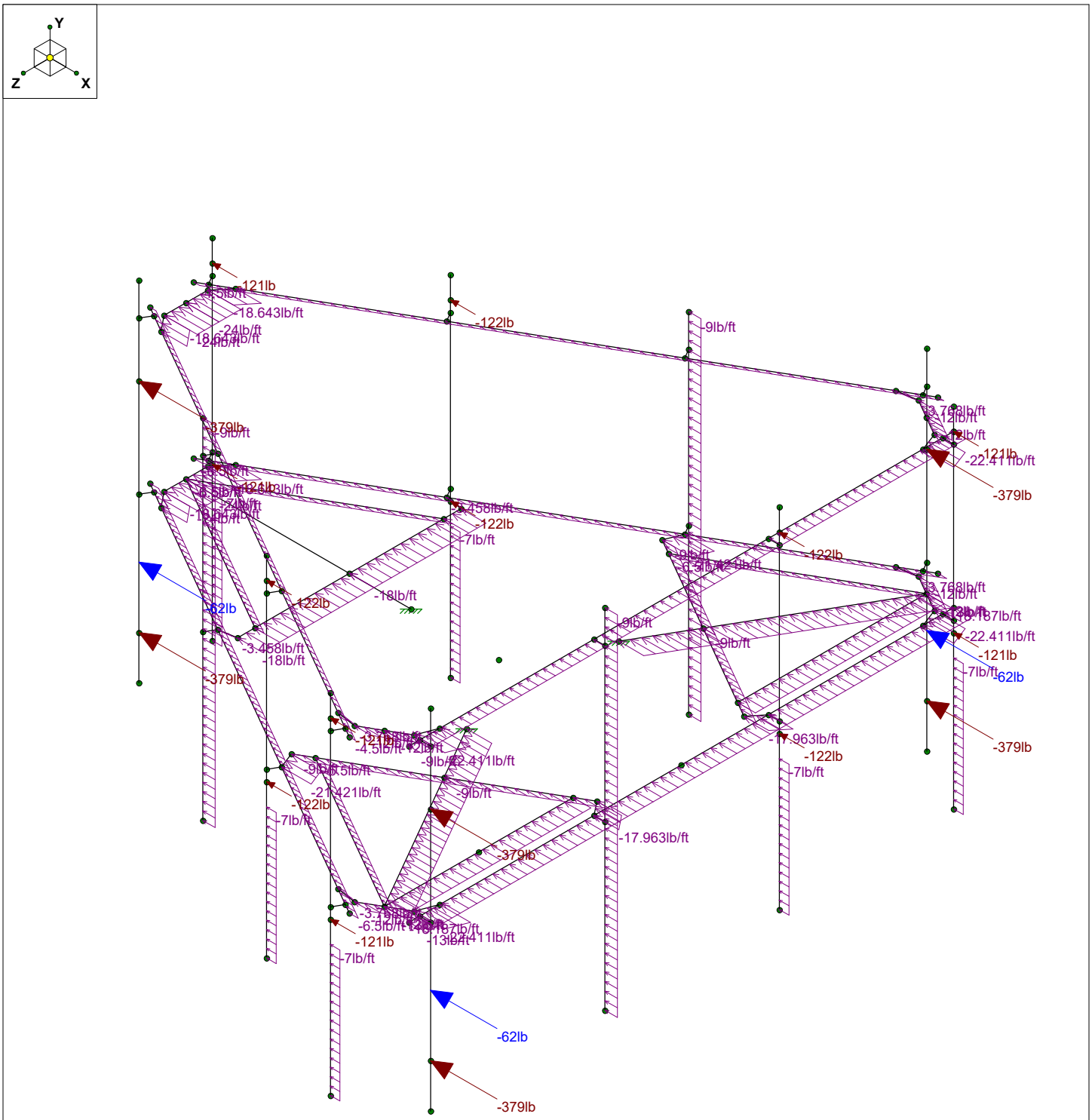


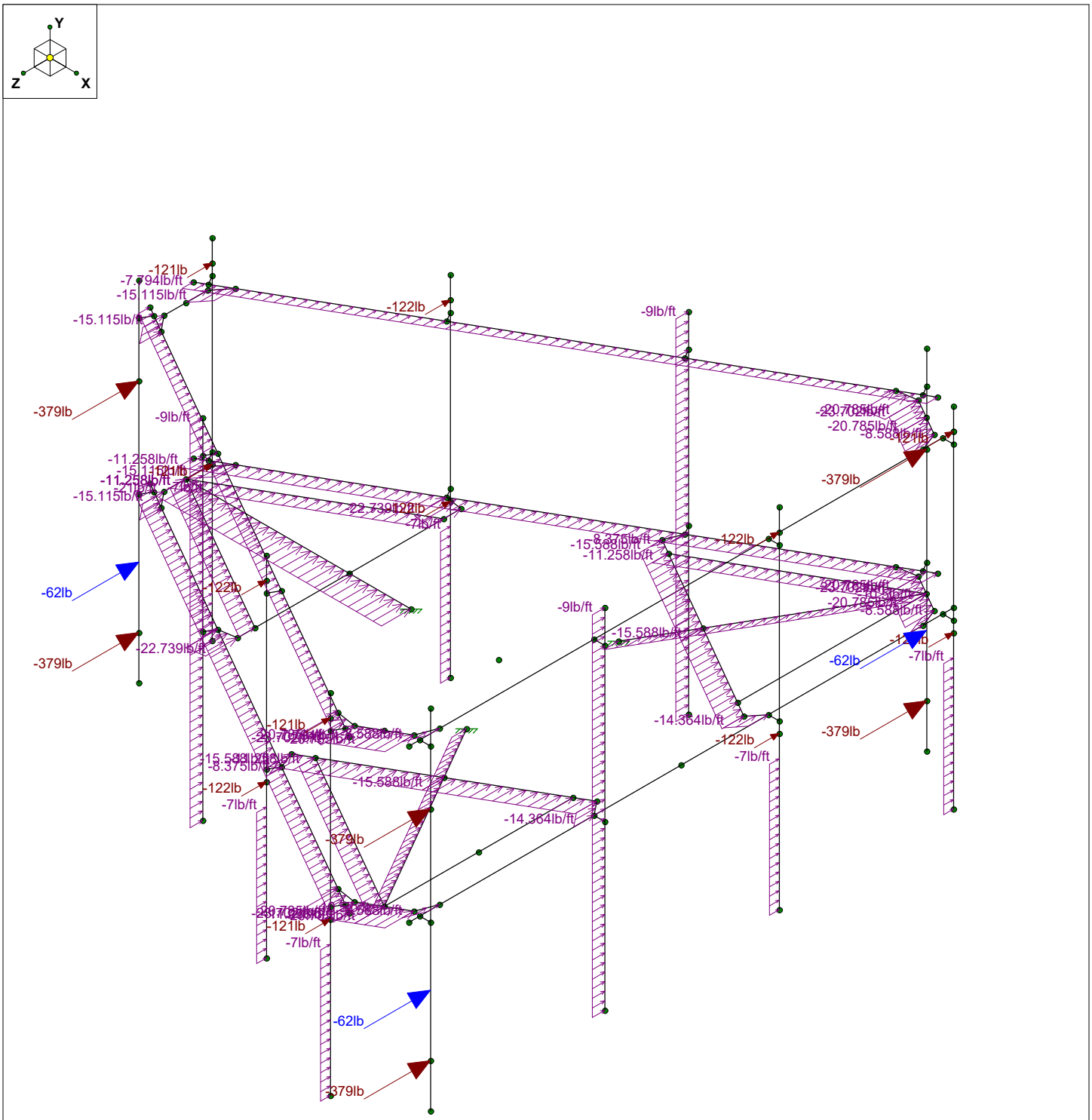
Loads: BLC 1, DEAD LOAD

Tectonic	Platform	SK - 6
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



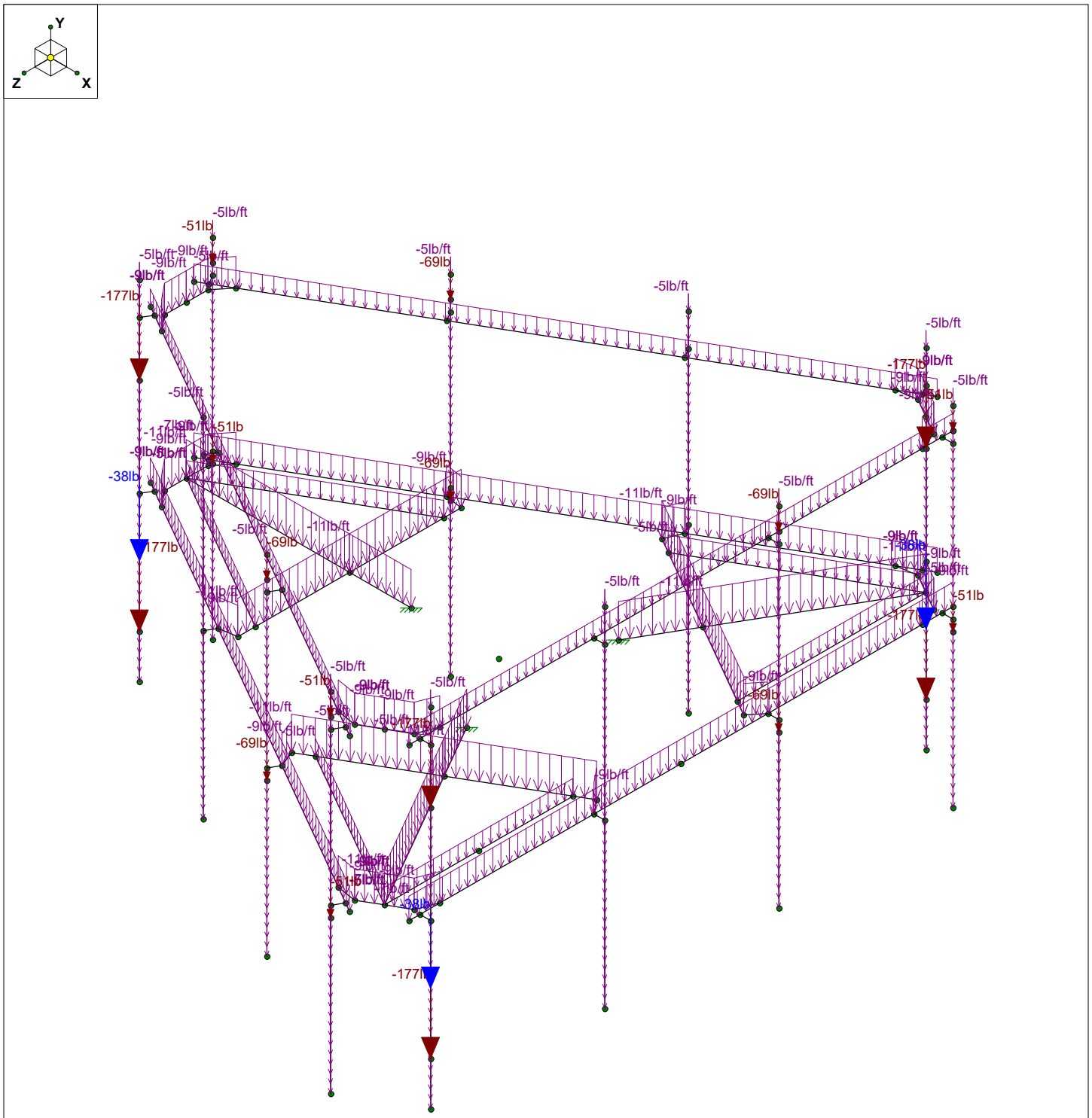
Loads: BLC 2, WIND X

Tectonic	Platform	SK - 7
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



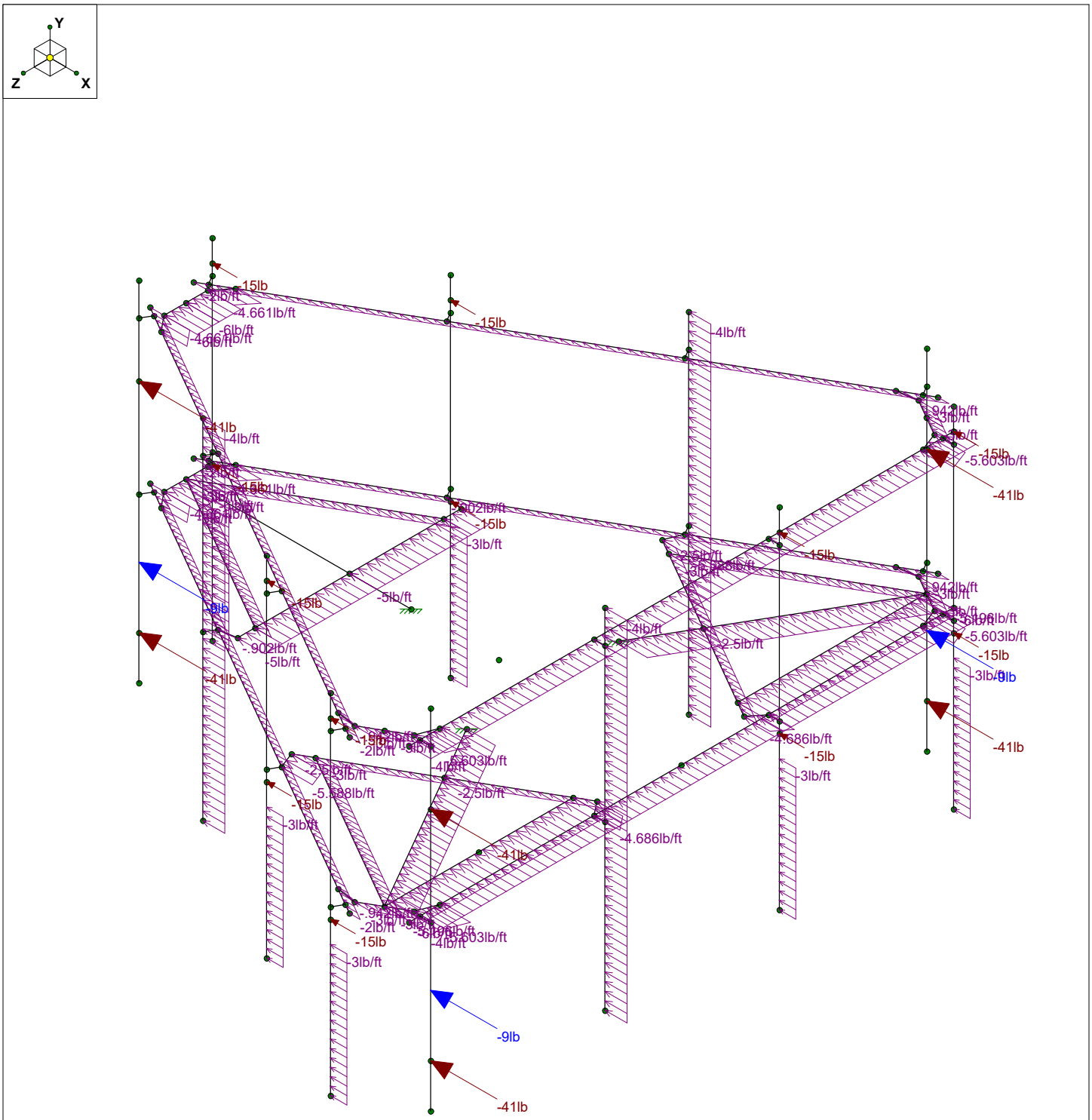
Loads: BLC 3, WIND Z

Tectonic	Platform	SK - 8
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



Loads: BLC 4, ICE LOAD

Tectonic	Platform	SK - 9
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



Loads: BLC 5, WIND + ICE IN X

Tectonic	Platform	SK - 10
SG		Sept 28, 2018 at 4:17 PM
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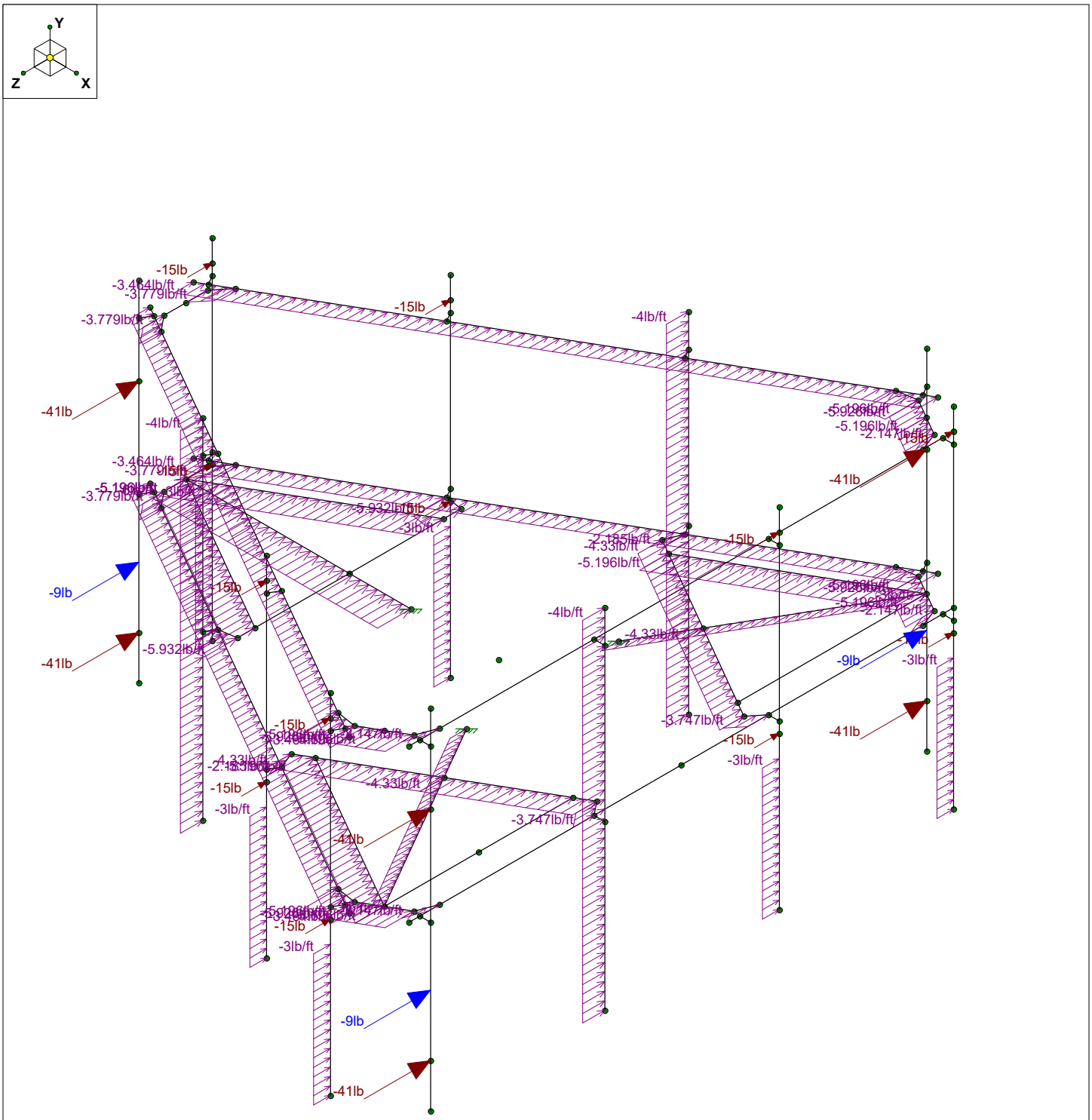
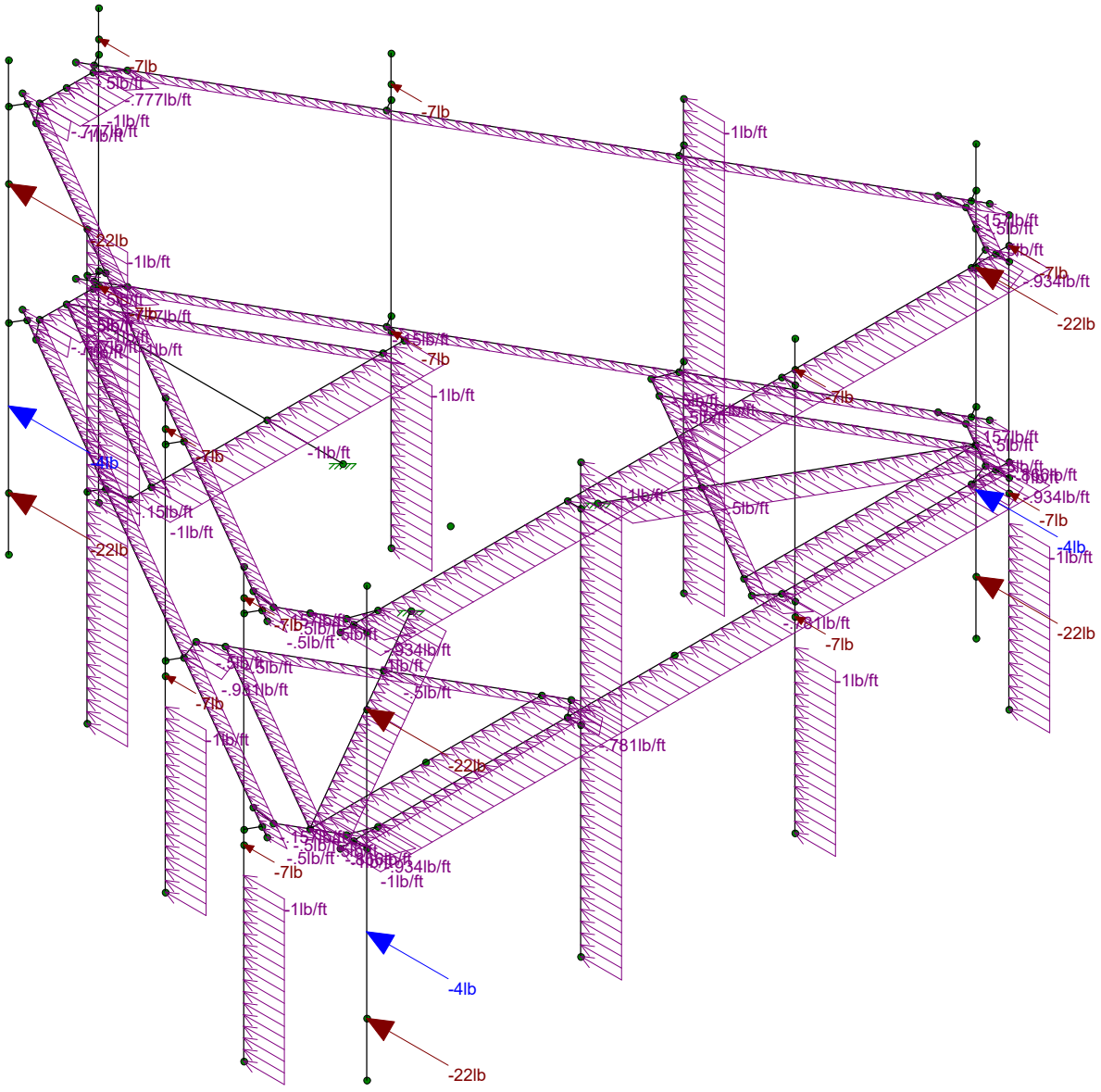


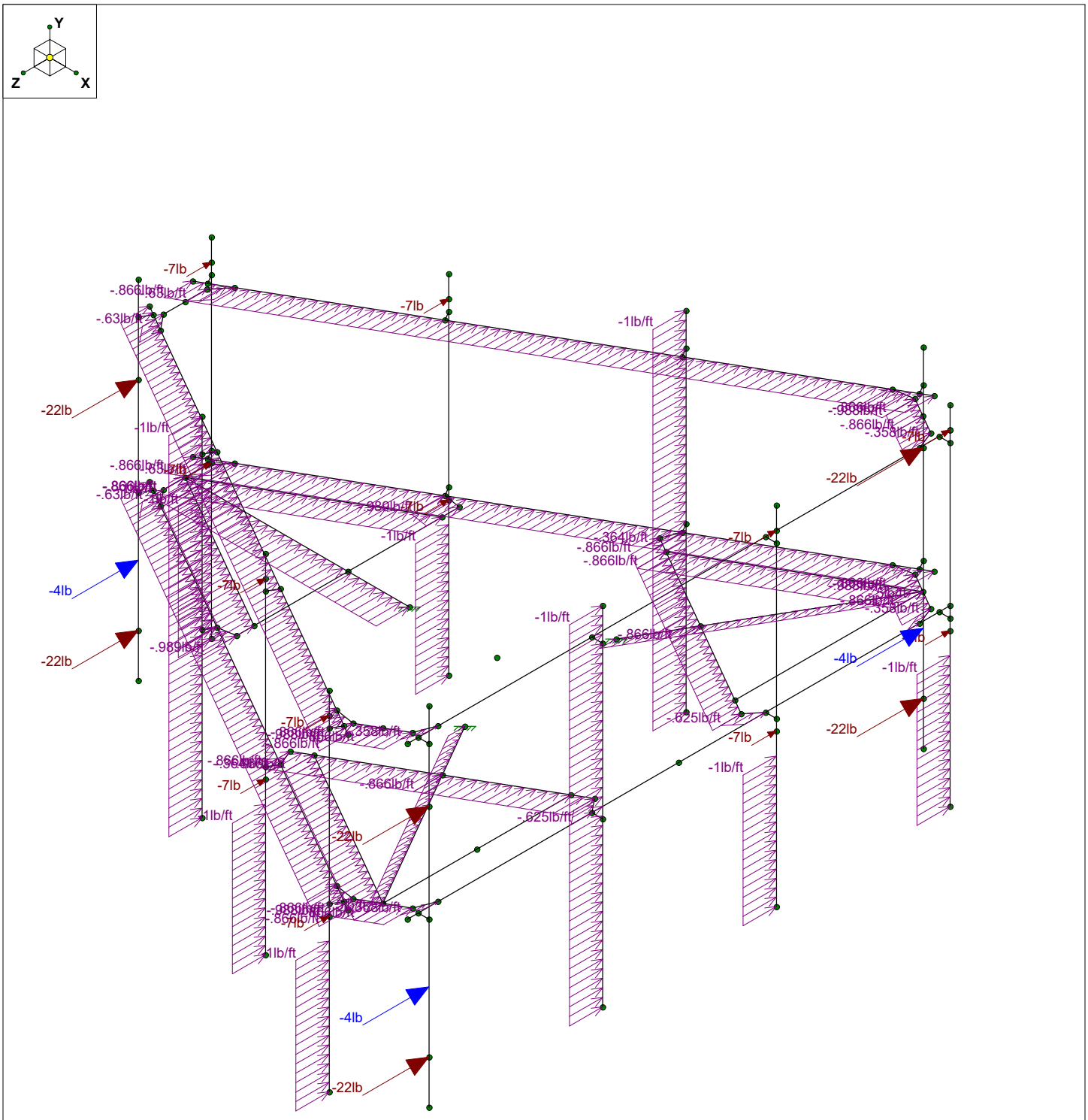
Loads: BLC 6, WIND + ICE IN Z

Tectonic	Platform	SK - 11
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



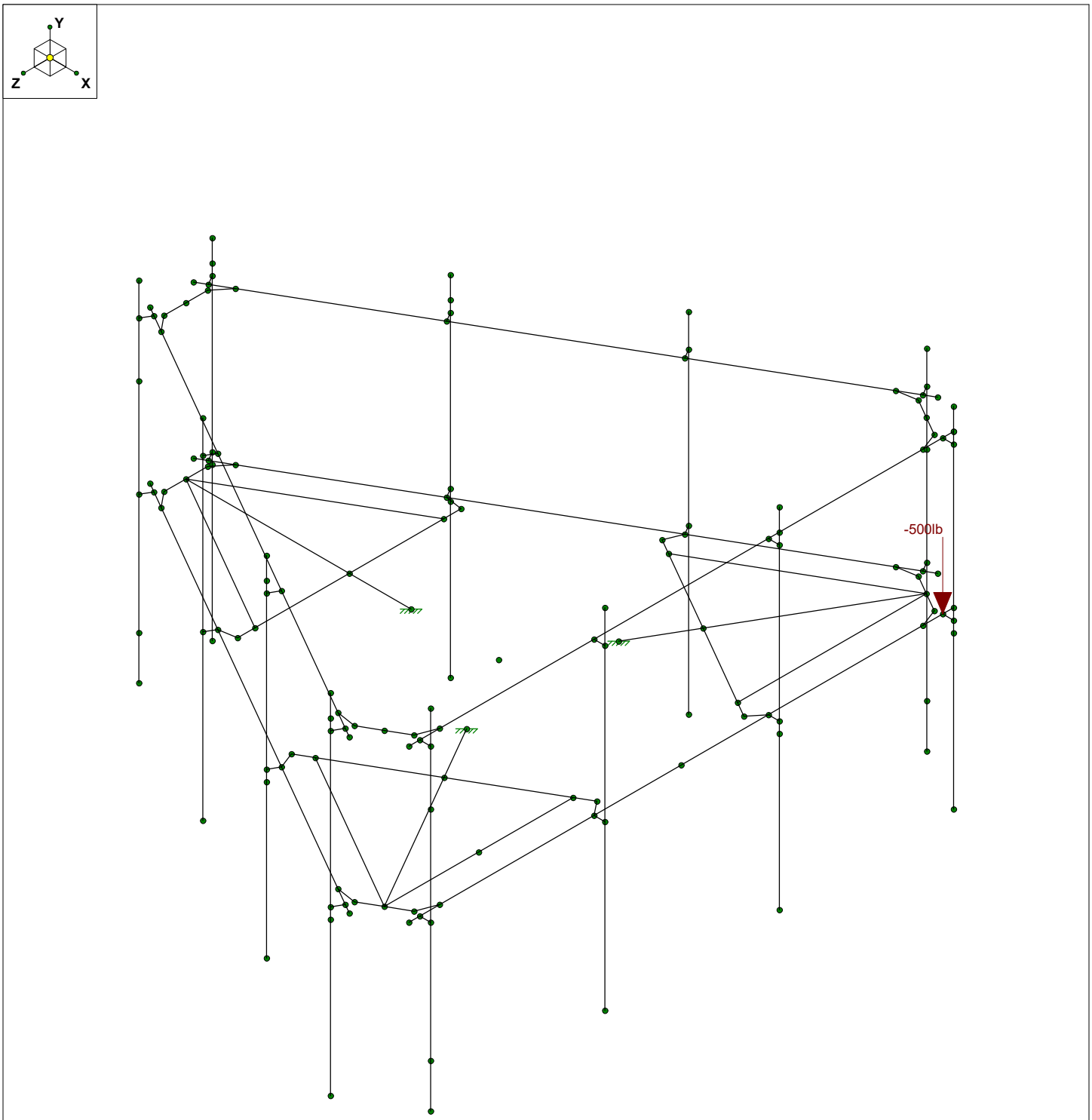
Loads: BLC 7, WIND X Main

Tectonic	Platform	SK - 12
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



Loads: BLC 8, WIND Z Main

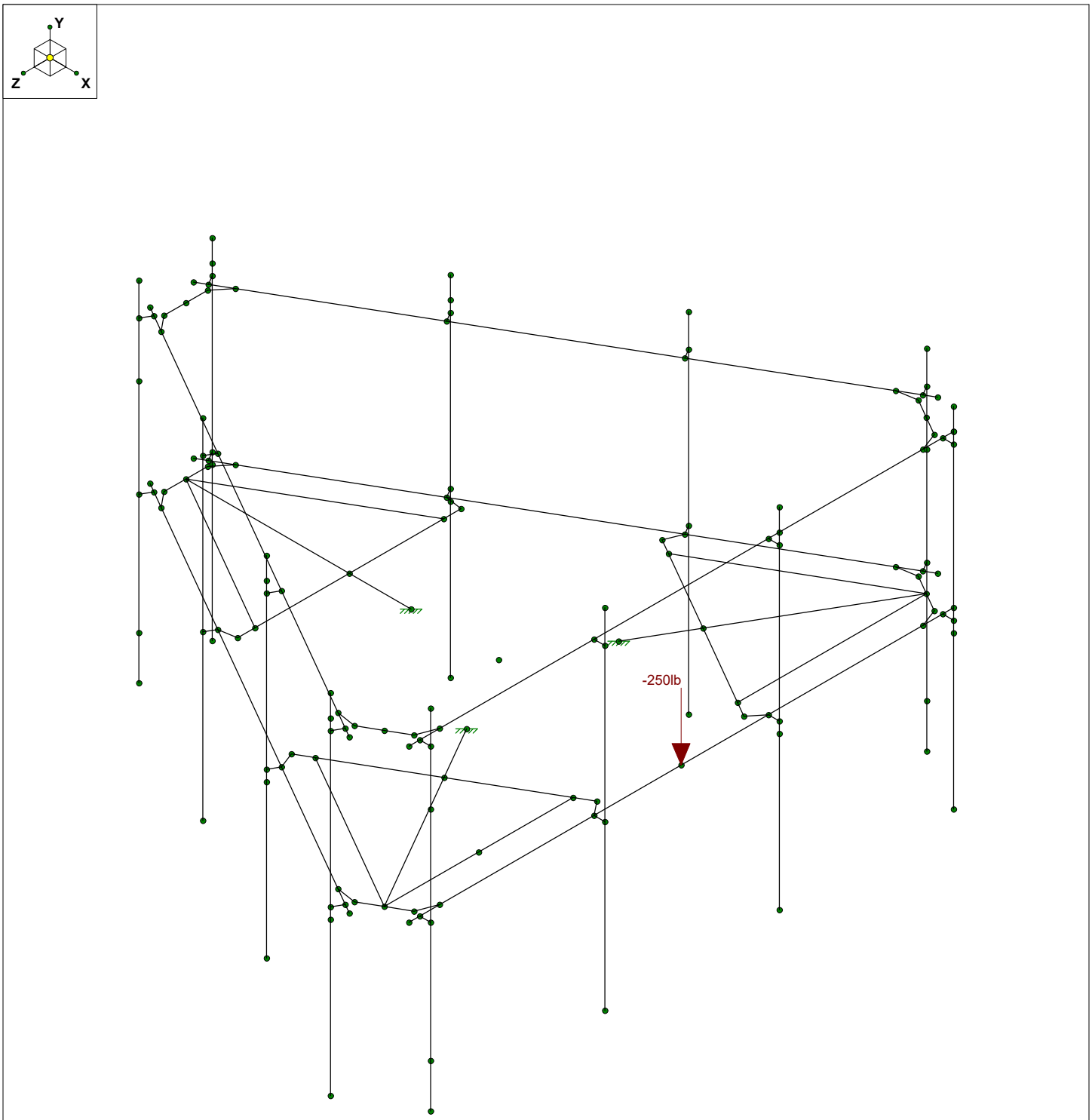
Tectonic	Platform	SK - 13
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



500 LB MAN LIVE LOAD APPLIED INDIVIDUALLY AT MOUNT PIPE LOCATION. (4 LOCATIONS TOTAL)

Loads: BLC 9, LM1

Tectonic	Platform	SK - 14
SG		Sept 28, 2018 at 4:17 PM
9500.876323		9500.876323 Mount Analysis.r3d



250 LB MAN LIVE LOAD
(4 LOCATIONS TOTAL)

Loads: BLC 16, LV4

Tectonic	Platform	SK - 15
SG		Sept 28, 2018 at 4:18 PM
9500.876323		9500.876323 Mount Analysis.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Tectonic	Job No.:	9500.876323		
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.	Sheet No.:	1	of	4
	Calculated By:	SG	Date :	09/28/18
	Checked By:	KZ	Date :	09/28/18

WIND AND ICE LOADS PER TIA-222-H

W.O.	9500.876323
Project Name	Hillside
Location	85 Plainfield Ave, West Haven,CT 06516
County	New Haven

Tower Type	MP	Monopole
Structure Height	148	ft
Supporting Str Height	0	ft Or ground mounted
Risk Category	II	Moderate risk
Exposure Category	B	Suburban/wooded/obstructed
Topo Category	1	Flat or rolling terrain
Height of crest	0	ft
Mean elevation (z_s)	157	ft

Ultimate Wind Speed (3-sec gust):		
Without ice	125	mph
With ice	50	mph
Maintenance Wind	30	mph
Ice thickness	1.50	in

Importance Factor	
Ice thickness	1.00
Earthquake	1.00
Supporting Data:	
K_s	1.00
K_e	0.99
K_c	0.90
K_t	N/A
f	N/A
z_g	1200
α	7
$K_{z,min}$	0.7
K_d	0.95
G_h	1.00

Height	z (ft)	146
	Kh	N/A
	Kzt	1.00
	Kz	1.10
	Kiz	1.16
Wind Pressure, qz (psf)	No Ice	41.60
	With Ice	6.66
	Service	2.40
(tiz)	Ice Thk	1.74
Appurtenances (qzGh)	No Ice	41.60
	With Ice	6.66
	Service	2.40

Note : Wind speed based on 2016 Connecticut State Building Code

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	9500.876323		
Sheet No.	2	of	4
Calculated By	SG	Date :	09/28/18
Checked By	KZ	Date :	09/28/18

Equipment Information

Shielding factor, Ka: 0.9 — Section 16.6

WIND WITHOUT ICE

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical ?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(Aa)_T$ (ft^2)	Wind ward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Antenna Weight (lb)	Total Weight (lb)
APX16DWV-16DWVS-E-A20	P	3	146	4.66	13.00	3.15	Flat	1.28	1.76	5.05	17.44	1.22	5.80	242	81	48.4	145.2
APXVAARR24_43-C-NA20	P	3	146	7.99	24.00	8.70	Flat	1.27	1.53	15.98	54.66	5.79	24.00	758	333	128.0	384.0
AIR -32 B2A/B66AA	E	3	146	4.72	12.90	8.70	Flat	1.28	1.38	5.07	17.58	3.42	12.72	244	176	132.2	396.6
RADIO 449 B12/B71	P	3	146	1.25	13.19	9.25	Flat	1.20	1.20	1.37	4.44	0.96	3.11	62	43	75.0	225.0
Mounting Pipe_2.0" STD	P	6	146	1.00	2.40	2.40	Cylindrical	1.00	0.76	0.20	1.08	0.20	0.82	7	6	30.0	180.0
										$\sum(CaAa)_N$	95.19	$\sum(CaAa)_T$	46.45				1331

WIND WITH ICE — Ice Thk = 1.74 in

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical ?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Ice Area for Weight (ft^2)	Ice Weight Alone (lbs)
APX16DWV-16DWVS-E-A20	P	3.00	146.00	4.95	16.48	6.63	Cylindrical	0.72	0.72	6.80	13.29	2.73	5.35	29	12	12.5	101.8
APXVAARR24_43-C-NA20	P	3.00	146.00	8.28	27.48	12.18	Cylindrical	0.72	0.725	18.97	37.12	8.41	16.45	82	37	43.6	353.8
AIR -32 B2A/B66AA	E	3.00	146.00	5.01	16.38	12.18	Cylindrical	0.73	0.726	6.83	13.40	5.08	9.96	30	22	17.0	137.9
RADIO 449 B12/B71	P	3.00	146.00	1.54	16.67	12.73	Cylindrical	0.7	0.7	2.13	4.03	1.63	3.08	9	7	4.7	37.8
Mounting Pipe_2.0" STD	P	6.00	146.00	1.29	5.88	5.88	Cylindrical	0.70	0.703	0.63	2.40	0.63	2.40	3	3	0.6	5.1
										$\sum(CaAa)_N$	70.24	$\sum(CaAa)_T$	37.24				631

MAINTENANCE WIND

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical ?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)
APX16DWV-16DWVS-E-A20	P	3	146	4.66	13.00	3.15	Flat	1.28	1.76	5.05	17.44	1.22	5.80	14	5
APXVAARR24_43-C-NA20	P	3	146	7.99	24.00	8.70	Flat	1.27	1.53	15.98	54.66	5.79	24.00	44	19
AIR -32 B2A/B66AA	E	3	146	4.72	12.90	8.70	Flat	1.28	1.38	5.07	17.58	3.42	12.72	14	10
RADIO 449 B12/B71	P	3	146	1.25	13.19	9.25	Flat	1.20	1.20	1.37	4.44	0.96	3.11	4	2
Mounting Pipe_2.0" STD	P	6	146	1.00	2.40	2.40	Cylindrical	0.76	0.76	0.20	0.82	0.20	0.82	0.3	0.3
										$\sum(CaAa)_N$	94.93	$\sum(CaAa)_T$	46.45		

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 9500.876323
Sheet No. 4 of 4
Calculated By SG Date : 09/28/18
Checked By KZ Date : 09/28/18

Mounting System Information

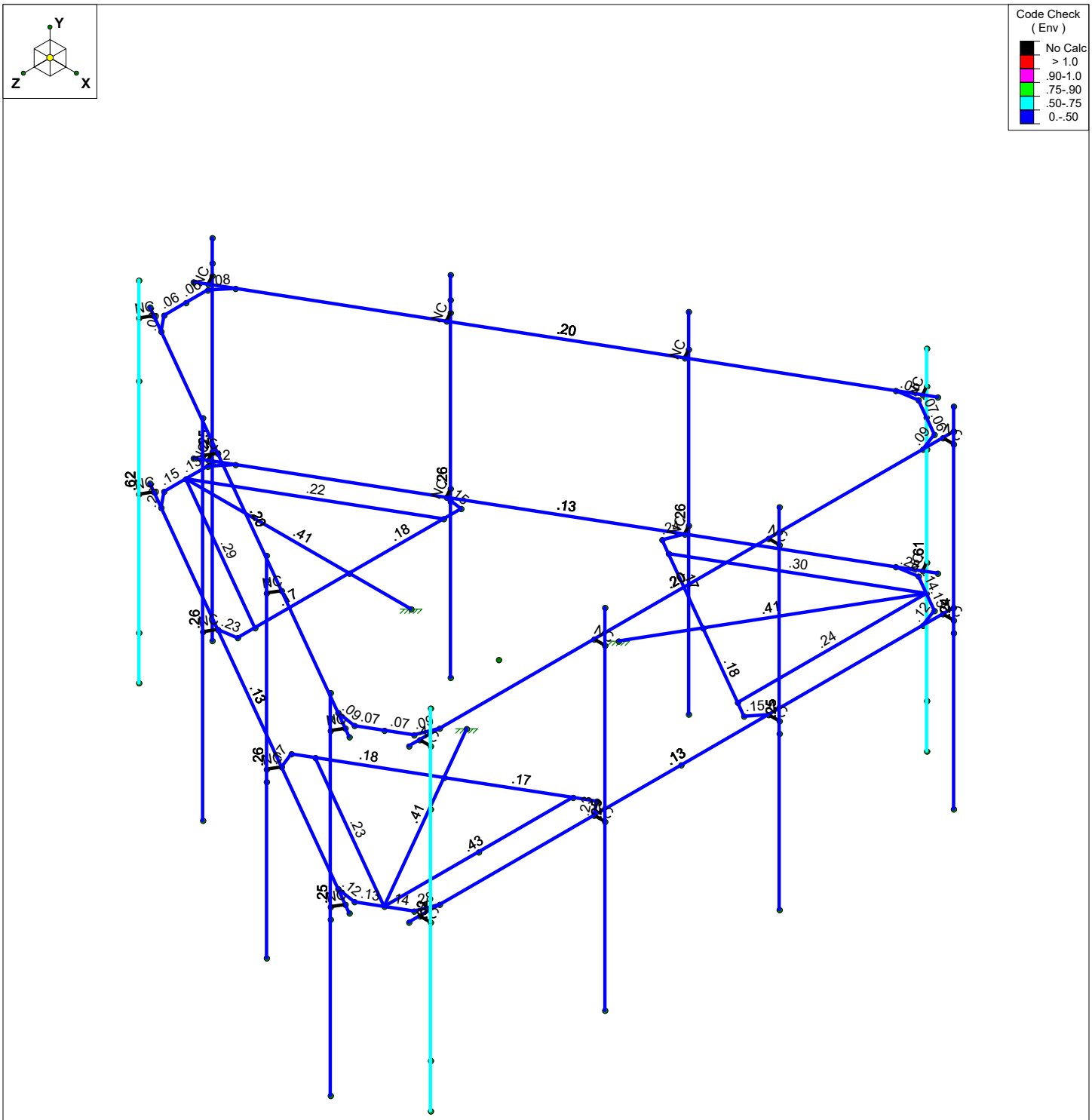
Mount Center Line:	146 ft

										Reduction Factor =	0.9	Section 16.6	
Mount Part	**Quantity**	**Length (ft)**	**Projected Width (in)**	**Depth (in)**	**Flat or Cylindrical ?**	**Force Coefficient**	**Projected Area (ft^2)**	**Wind Force (lbs/ft)**	**Ice Weight Area (ft^2)**	**Ice Weight (lbs/ft)**	**Projected Area with Ice (ft^2)**	**Wind Force Ice (lbs/ft)**	**Mainten-ance Wind Force (lbs/ft)**
Mount Pipe - 2.0" STD	12	8.00	2.40	2.40	Cylindrical	1.2	0.24	9.0	0.63	5.1	0.59	3.5	0.5
Horizontal Pipe_3.0 STD	3	12.50	3.50	3.50	Cylindrical	1.2	0.35	13.1	0.92	7.4	0.70	4.2	0.8
Top Rail Pipe_2.0 STD	3	12.50	2.40	2.40	Cylindrical	1.2	0.24	9.0	0.63	5.1	0.59	3.5	0.5
Grating Support L2x2x3/16	6	4.33	2.00	2.00	Flat	2.00	0.33	12.5	0.67	5.4	0.91	5.5	0.7
Cross Arm HSS4x4x1/4	6	2.57	4.00	4.00	Flat	1.42	0.47	17.8	1.33	10.8	0.89	5.3	1.0
Support Arm HSS4x4x1/4	3	5.17	4.00	4.00	Flat	1.68	0.56	21.0	1.33	10.8	1.05	6.3	1.2
Connection Plate 6x1/2	6	0.40	6.00	0.50	Flat	1.20	0.60	22.5	1.08	8.8	0.95	5.7	1.3
Connection Plate 6x1/2	6	1.90	6.00	0.50	Flat	1.26	0.63	23.5	1.08	8.8	0.99	6.0	1.4

Notes:
1. HSS members are considered to be Flat in determining the force coefficient (Ca), conservative (Table 2-9, Page 2-46)
2. Member sizes are based on mount assembly drawing for RMQP-496-HK by SitePro1. dated 7/14/14.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Tectonic	Platform	SK - 16
SG		Sept 28, 2018 at 4:29 PM
9500.876323		9500.876323 Mount Analysis.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B R...	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
8	Q235	29000	11154	.3	.65	.49	34	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horizontal Pipe_3.0"STD	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	Cross Arm HSS4x4x1/4	HSS4X4X4	Beam	Tube	Q235	Typical	3.37	7.8	7.8	12.8
3	Support Arm HSS4x4x1/4	HSS4X4X4	Beam	Tube	Q235	Typical	3.37	7.8	7.8	12.8
4	Mount Pipe_2.0 Std	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	Connection Plate 6x1/2	Plate 6"x1/2"	Beam	RECT	Q235	Typical	3	.063	9	.237
6	Grating Support L2x2x3/16	L2x2x3	Beam	Single An...	Q235	Typical	.722	.271	.271	.009
7	Top Rail_2.0" STD	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	DEAD LOAD	DL		-1.05		18	3			
2	WIND X	WLX				18	3	60		
3	WIND Z	WLZ				18	3	60		
4	ICE LOAD	SL				18	3	63		
5	WIND + ICE IN X	WL+X				18	3	60		
6	WIND + ICE IN Z	WL+Z				18	3	60		
7	WIND X Main	WL+X				18	3	60		
8	WIND Z Main	WL+Z				18	3	60		
9	LM1	OL1				1				
10	LM2	OL2				1				
11	LM3	OL3				1				
12	LM4	OL4				1				
13	LV1	OL5				1				
14	LV2	OL6				1				
15	LV3	OL8				1				
16	LV4	OL9				1				

Load Combinations

	Description	So...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		1	1.4																		
2	1.2D+1.0(WLX+WLZ) - 0 Deg	Yes	Y		1	1.2	2	1																
3	1.2D+1.0(WLX+WLZ) - 30 Deg	Yes	Y		1	1.2	2	.87	3	.5														
4	1.2D+1.0(WLX+WLZ) - 60 Deg	Yes	Y		1	1.2	2	.5	3	.87														
5	1.2D+1.0(WLX+WLZ) - 90 Deg	Yes	Y		1	1.2	2		3	1														
6	1.2D+1.0(WLX+WLZ) - 120 Deg	Yes	Y		1	1.2	2	-.5	3	.87														
7	1.2D+1.0(WLX+WLZ) - 150 Deg	Yes	Y		1	1.2	2	-.87	3	.5														
8	1.2D+1.0(WLX+WLZ) - 180 Deg	Yes	Y		1	1.2	2	-1	3															
9	1.2D+1.0(WLX+WLZ) - 210 Deg	Yes	Y		1	1.2	2	-.87	3	-.5														
10	1.2D+1.0(WLX+WLZ) - 240 Deg	Yes	Y		1	1.2	2	-.5	3	-.87														
11	1.2D+1.0(WLX+WLZ) - 270 Deg	Yes	Y		1	1.2	2		3	-1														

Load Combinations (Continued)

	Description	So..	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
12	1.2D+1.0(WLX+WLZ) - 300 Deg	Yes	Y		1	1.2	2	.5	3	-.87																
13	1.2D+1.0(WLX+WLZ) - 330 Deg	Yes	Y		1	1.2	2	.87	3	-.5																
14	**Wind Load with Ice**																									
15	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	1	6															
16	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.87	6	.5														
17	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.5	6	.87														
18	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5		6	1														
19	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.5	6	.87														
20	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.87	6	.5														
21	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-1	6															
22	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.87	6	-.5														
23	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.5	6	-.87														
24	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5		6	-1														
25	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.5	6	-.87														
26	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.87	6	-.5														
27	** Maintenance Load LM1**																									
28	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	1			9	1.5														
29	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	.5	9	1.5														
30	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	.87	9	1.5														
31	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	1	9	1.5														
32	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	.87	9	1.5														
33	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	.5	9	1.5														
34	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-1	8		9	1.5														
35	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	-.5	9	1.5														
36	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	-.87	9	1.5														
37	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	-1	9	1.5														
38	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	-.87	9	1.5														
39	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	-.5	9	1.5														
40	** Maintenance Load LM2**																									
41	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	1			10	1.5														
42	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	.5	10	1.5														
43	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	.87	10	1.5														
44	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	1	10	1.5														
45	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	.87	10	1.5														
46	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	.5	10	1.5														
47	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-1	8		10	1.5														
48	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	-.5	10	1.5														
49	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	-.87	10	1.5														
50	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	-1	10	1.5														
51	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	-.87	10	1.5														
52	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	-.5	10	1.5														
53	** Maintenance Load LM3**																									
54	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	1			11	1.5														
55	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	.5	11	1.5														
56	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	.87	11	1.5														
57	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	1	11	1.5														
58	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	.87	11	1.5														
59	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	.5	11	1.5														
60	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-1	8		11	1.5														
61	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	-.5	11	1.5														
62	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	-.87	11	1.5														
63	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	-1	11	1.5														
64	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	-.87	11	1.5														
65	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	-.5	11	1.5														
66	** Maintenance Load LM4**																									
67	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	1			12	1.5														
68	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	.5	12	1.5														

Load Combinations (Continued)

	Description	So..	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
69	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	.87	12	1.5												
70	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	1	12	1.5												
71	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	.87	12	1.5												
72	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	.5	12	1.5												
73	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-1	8		12	1.5												
74	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.87	8	-.5	12	1.5												
75	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	-.5	8	-.87	12	1.5												
76	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7		8	-1	12	1.5												
77	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.5	8	-.87	12	1.5												
78	1.2D+1.0(WLXm+WLZm)+1.5...	Yes	Y		1	1.2	7	.87	8	-.5	12	1.5												
79	** Service Load **																							
80	1.2D+1.5Lv	Yes	Y		1	1.2	13	1.5																
81	** Service Load **																							
82	1.2D+1.5Lv	Yes	Y		1	1.2	14	1.5																
83	** Service Load **																							
84	1.2D+1.5Lv	Yes	Y		1	1.2	15	1.5																
85	** Service Load **																							
86	1.2D+1.5Lv	Yes	Y		1	1.2	16	1.5																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N14	max	2807.785	2	2205.771	15	957.566	5	229.501	6	1198.597	5	-1175.001	8
2		min	-2825.08	8	662.133	8	-957.541	11	-143.635	13	-1197.999	11	-4756.734	15
3	N15	max	1646.924	13	2201.435	19	2428.937	6	4088.603	19	941.543	9	2595.134	33
4		min	-1638.258	7	671.63	12	-2443.816	12	943.827	12	-940.93	3	748.167	12
5	N16	max	1704.932	3	2201.423	23	2414.875	4	-1123.247	4	941.757	13	2535.063	61
6		min	-1696.49	9	671.719	4	-2399.576	10	-4135.922	23	-941.117	7	420.417	3
7	Totals:	max	5619.332	2	6420.415	18	5513.751	5						
8		min	-5619.328	8	3000.186	12	-5513.753	11						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M64	PIPE_2.0	.622	4.25	11	.077	4.25		11	14916....	32130	1871.625	1871.625	1...	H1-1b
2	M52	PIPE_2.0	.621	4.25	8	.078	4.25		7	14916....	32130	1871.625	1871.625	2...	H1-1b
3	M67	PIPE_2.0	.613	4.25	2	.076	4.25		3	14916....	32130	1871.625	1871.625	1...	H1-1b
4	M13	L2x2x3	.434	4.33	84	.029	4.33	z	84	9098.661	22093.2	526.732	1156.938	2...	H2-1
5	M3	HSS4X4X4	.413	5.167	25	.086	5.167	y	18	94947....	103122	11959.5	11959.5	2...	H1-1b
6	M5	HSS4X4X4	.411	5.167	22	.127	5.167	y	74	94947....	103122	11959.5	11959.5	2...	H1-1b
7	M4	HSS4X4X4	.409	5.167	20	.135	5.167	y	48	94947....	103122	11959.5	11959.5	2...	H1-1b
8	M10	L2x2x3	.301	0	5	.006	0	z	10	9098.661	22093.2	526.732	1130.338	1...	H2-1
9	M11	L2x2x3	.294	4.33	13	.006	4.33	y	6	9098.661	22093.2	526.732	1132.846	1...	H2-1
10	M31	Plate 6"x1/2"	.284	.454	10	.135	.454	y	10	85527....	91800	956.25	11475	1...	H1-1b
11	M29	Plate 6"x1/2"	.283	.454	2	.131	.454	y	2	85527....	91800	956.25	11475	1...	H1-1b
12	M33	Plate 6"x1/2"	.282	.454	6	.134	.454	y	6	85527....	91800	956.25	11475	1...	H1-1b
13	M84	PIPE_2.0	.264	4.25	4	.041	.75		15	14916....	32130	1871.625	1871.625	1...	H1-1b
14	M81	PIPE_2.0	.259	4.25	13	.036	4.25		15	14916....	32130	1871.625	1871.625	1...	H1-1b
15	M78	PIPE_2.0	.258	4.25	8	.042	.75		19	14916....	32130	1871.625	1871.625	1...	H1-1b
16	M87	PIPE_2.0	.258	4.25	9	.038	4.25		10	14916....	32130	1871.625	1871.625	1...	H1-1b
17	M59	PIPE_2.0	.254	4.25	12	.041	.75		23	14916....	32130	1871.625	1871.625	1...	H1-1b
18	M72	PIPE_2.0	.247	4.25	20	.051	.75		18	14916....	32130	1871.625	1871.625	2...	H1-1b
19	M63	PIPE_2.0	.247	4.25	16	.051	.75		26	14916....	32130	1871.625	1871.625	1...	H1-1b
20	M75	PIPE_2.0	.245	4.25	5	.036	4.25		7	14916....	32130	1871.625	1871.625	1...	H1-1b
21	M20	Plate 6"x1/2"	.245	.399	11	.086	0	y	2	86919....	91800	956.25	11475	1...	H1-1b
22	M60	PIPE_2.0	.243	4.25	24	.052	.75		22	14916....	32130	1871.625	1871.625	1...	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
23	M14	L2x2x3	.237	4.33	7	.007	4.33	z	2	9098.661	22093.2	526.732	1170.441	2...	H2-1
24	M12	L2x2x3	.232	0	11	.006	0	y	6	9098.661	22093.2	526.732	1170.441	2...	H2-1
25	M18	Plate 6"x1/2"	.228	.399	7	.089	0	y	10	86919....	91800	956.25	11475	1...	H1-1b
26	M22	Plate 6"x1/2"	.225	0	3	.091	.399	y	77	86919....	91800	956.25	11475	1...	H1-1b
27	M9	L2x2x3	.225	4.33	3	.006	4.33	z	10	9098.661	22093.2	526.732	1170.107	2...	H2-1
28	M38	PIPE_2.0	.203	8.333	26	.106	.651		11	6295.422	32130	1871.625	1871.625	2...	H1-1b
29	M39	PIPE_2.0	.203	8.333	22	.108	.651		7	6295.422	32130	1871.625	1871.625	2...	H1-1b
30	M37	PIPE_2.0	.201	4.167	18	.106	11.8...		3	6295.422	32130	1871.625	1871.625	2...	H1-1b
31	M17	HSS4X4X4	.181	2.565	24	.066	.374	z	11	101044...	103122	11959.5	11959.5	1...	H1-1b
32	M7	HSS4X4X4	.180	0	20	.067	2.191	z	8	101044...	103122	11959.5	11959.5	1...	H1-1b
33	M6	HSS4X4X4	.180	0	16	.065	2.191	z	4	101044...	103122	11959.5	11959.5	1...	H1-1b
34	M8	HSS4X4X4	.173	0	74	.067	2.191	z	3	101044...	103122	11959.5	11959.5	1...	H1-1b
35	M23	Plate 6"x1/2"	.169	0	5	.106	.399	y	6	86919....	91800	956.25	11475	1...	H1-1b
36	M16	HSS4X4X4	.168	2.565	18	.066	.374	z	11	101044...	103122	11959.5	11959.5	1...	H1-1b
37	M15	HSS4X4X4	.168	2.565	26	.065	.374	z	7	101044...	103122	11959.5	11959.5	1...	H1-1b
38	M19	Plate 6"x1/2"	.153	0	9	.106	.399	y	10	86919....	91800	956.25	11475	1...	H1-1b
39	M21	Plate 6"x1/2"	.149	.399	13	.110	0	y	2	86919....	91800	956.25	11475	1...	H1-1b
40	M24	Plate 6"x1/2"	.147	.5	7	.112	0	y	4	84242.25	91800	956.25	11343....	1...	H1-1b
41	M25	Plate 6"x1/2"	.144	.5	11	.112	0	y	8	84242.25	91800	956.25	11323....	1...	H1-1b
42	M36	Plate 6"x1/2"	.144	0	3	.113	.5	y	12	84242.25	91800	956.25	11381....	1...	H1-1b
43	M34	Plate 6"x1/2"	.128	0	3	.089	.5	y	24	84242.25	91800	956.25	11475	1...	H1-1b
44	M27	PIPE_3.0	.127	8.333	24	.137	11.8...		12	28250....	65205	5748.75	5748.75	1...	H1-1b
45	M1	PIPE_3.0	.127	4.167	21	.137	.651		8	28250....	65205	5748.75	5748.75	1...	H1-1b
46	M2	PIPE_3.0	.127	8.333	16	.137	11.8...		4	28250....	65205	5748.75	5748.75	1...	H1-1b
47	M35	Plate 6"x1/2"	.126	0	7	.090	.5	y	16	84242.25	91800	956.25	11475	1...	H1-1b
48	M26	Plate 6"x1/2"	.126	.5	11	.096	0	y	58	84242.25	91800	956.25	11475	1...	H1-1b
49	M28	Plate 6"x1/2"	.120	.454	6	.112	0	y	12	85527....	91800	956.25	11475	2...	H1-1b
50	M30	Plate 6"x1/2"	.120	.454	2	.114	0	y	8	85527....	91800	956.25	11475	2...	H1-1b
51	M32	Plate 6"x1/2"	.118	.454	10	.113	0	y	4	85527....	91800	956.25	11475	2...	H1-1b
52	M43	Plate 6"x1/2"	.092	.454	6	.168	0	y	6	85527....	91800	956.25	11475	1...	H1-1b
53	M44	Plate 6"x1/2"	.091	.454	7	.144	0	y	2	85527....	91800	956.25	11475	1...	H1-1b
54	M46	Plate 6"x1/2"	.089	.454	3	.141	0	y	10	85527....	91800	956.25	11475	1...	H1-1b
55	M45	Plate 6"x1/2"	.088	.454	3	.170	0	y	2	85527....	91800	956.25	11475	1...	H1-1b
56	M48	Plate 6"x1/2"	.083	.454	11	.142	0	y	6	85527....	91800	956.25	11475	1...	H1-1b
57	M47	Plate 6"x1/2"	.083	.454	10	.169	0	y	10	85527....	91800	956.25	11475	1...	H1-1b
58	M51	Plate 6"x1/2"	.072	.5	12	.043	0	y	3	84242.25	91800	956.25	11475	1...	H1-1b
59	M41	Plate 6"x1/2"	.071	0	9	.041	.5	y	11	84242.25	91800	956.25	11475	1...	H1-1b
60	M42	Plate 6"x1/2"	.065	0	7	.043	0	y	3	84242.25	91800	956.25	11475	1...	H1-1b
61	M40	Plate 6"x1/2"	.064	0	4	.043	.5	y	7	84242.25	91800	956.25	11475	1...	H1-1b
62	M50	Plate 6"x1/2"	.062	.5	3	.041	.5	y	11	84242.25	91800	956.25	11475	1...	H1-1b
63	M49	Plate 6"x1/2"	.058	.5	11	.043	.5	y	7	84242.25	91800	956.25	11475	1...	H1-1b

MAXIMUM MEMBER STRESS IS AT 62% OF THEIR CAPACITY, THEREFORE, IT IS ADEQUATE TO SUPPORT THE PROPOSED UPGRADE.

APPENDIX D

ADDITIONAL CALCUATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	9500.876323		
Sheet No.	1	of	1
Calculated By	SG	Date :	09/28/18
Checked By	KZ	Date :	09/28/18

Proposed Connection Check- Platform

N16 Envelope

Connection Details		
Bolts		
Qty:	4	
Diam:	0.625	in.
VS:	6	in.
HS:	6	in.
Grade	A325N	
Tult	20.7	k
Vult	12.4	k

Loads per RISA model		
Fx	1.7	k
Fy	2.2	k
Fz	2.41	k
Mx	4.14	k-ft
My	0.94	k-ft
Mz	2.54	k-ft

T max	3.9	k		
V max	3.7	k		
Interaction	0.13	<	1.0	Pass

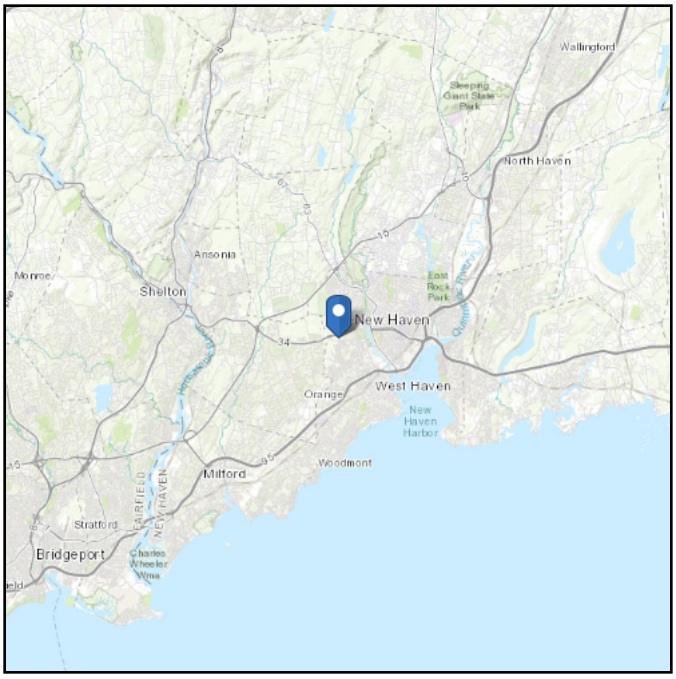
Therefore existing connection is adequate under proposed loads

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 157.22 ft (NAVD 88)
Latitude: 41.301275
Longitude: -72.976444



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	101 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Wed Sep 26 2018

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

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

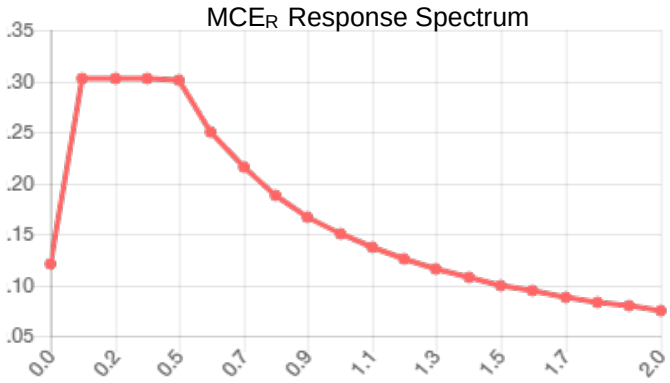
Seismic

Site Soil Class: D - Stiff Soil

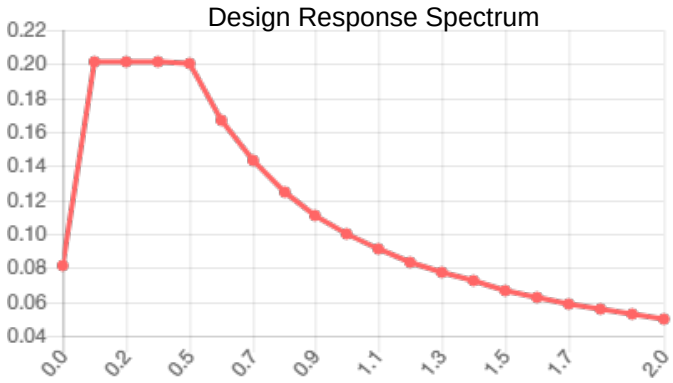
Results:

S_S :	0.189	S_{DS} :	0.201
S_1 :	0.063	S_{D1} :	0.100
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.099
S_{MS} :	0.302	PGA_M :	0.159
S_{M1} :	0.150	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B



S_a(g) vs T(s)



S_a(g) vs T(s)

Data Accessed: Wed Sep 26 2018

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Wed Sep 26 2018

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

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

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH506A

Crown West Haven Monopole
85 Plainfield Avenue
West Haven, CT 06516

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	8.98 %

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September 12, 2018

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

Emissions Analysis for Site: **CTNH506A – Crown West Haven Monopole**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **85 Plainfield Avenue, West Haven, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **85 Plainfield Avenue, West Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

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

8) The antennas used in this modeling are the **Ericsson AIR32 B2A/B66AA** & **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **146 feet** above ground level (AGL).

10) 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.

11) 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 AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	146 feet	Height (AGL):	146 feet	Height (AGL):	146 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.43**	Antenna B1 MPE%	**1.43**	Antenna C1 MPE%	**1.43**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	15.0 dBd	Gain:	15.0 dBd	Gain:	15.0 dBd
Height (AGL):	146 feet	Height (AGL):	146 feet	Height (AGL):	146 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	40	Total TX Power(W):	40	Total TX Power(W):	40
ERP (W):	1,706.32	ERP (W):	1,706.32	ERP (W):	1,706.32
Antenna A2 MPE%	**0.31**	Antenna B2 MPE%	**0.31**	Antenna C2 MPE%	**0.31**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	146 feet	Height (AGL):	146 feet	Height (AGL):	146 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.06**	Antenna B3 MPE%	**1.06**	Antenna C3 MPE%	**1.06**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.80 %**
Verizon Wireless	**3.16** %
Clearwire	**0.11** %
Sprint	**2.91** %
Site Total MPE %:	**8.98 %**

T-Mobile Sector A Total:	2.80 %
T-Mobile Sector B Total:	2.80 %
T-Mobile Sector C Total:	2.80 %
Site Total:	8.98 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	146	5.71	PCS - 1900 MHz	1000.00	0.57%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	146	8.56	AWS - 2100 MHz	1000.00	0.86%
T-Mobile PCS - 1900 MHz UMTS	1	1,706.32	146	3.13	PCS - 1900 MHz	1000.00	0.31%
T-Mobile 600 MHz LTE	2	788.97	146	2.89	600 MHz	400.00	0.72%
T-Mobile 700 MHz LTE	2	432.54	146	1.59	700 MHz	467.00	0.34%
						Total:	**2.80%**

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:	2.80 %
Sector B:	2.80 %
Sector C:	2.80 %
T-Mobile Maximum MPE % (Per Sector):	2.80 %
Site Total:	8.98 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.98%** 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.