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

June 17, 2019

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

RE: **Notice of Exempt Modification for T-Mobile:**
876399 - T-Mobile Site ID: CT11542A
60 South Main Street, East Granby, CT 06026
N 41.94155556 / W -72.73866667

Dear Ms. Bachman:

T-Mobile currently maintains 6 total antennas at the 90-foot mount on the existing 98-foot Monopole Tower, located at 60 South Main Street, East Granby, CT. The tower is owned by Crown Castle and the property is owned by Galasso Holdings LLC. T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700 MHz antennas. T-Mobile also intends to install three (3) new remote radios, swap out one (1) line of coax for one (1) hybrid fiber line as well as swap out one (1) cabinet for a replacement cabinet on the ground. Proposed tower modifications on baseplate and pole from 0' through 55.58'. As shown on the structural modification report.

Planned Modifications:
Tower:
Remove: (3) Bias T
(1) 7/8" Coax

Remove and Replace:

(3) LNX 6515-A1M Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43U-NA20 Antenna 600/700 MHz **(REPLACE)**
Install New:
(3) 4449 B71+B12 RRU
(1) Hybrid Lines

Existing to Remain:
(11) 7/8" Coax
(3) APX18-209014-C-A20 Antenna 1900/2100 MHz
(3) 1A- PCS Twin Style TMA

Ground:
Install New: RBS 6102 cabinet to replace existing ODE cabinet.

The facility was approved by the Town of East Granby Planning and Zoning Commission on November 29, 2000. This approval included the condition(s) that:

1. A letter of approval be provided from the FAA that the proposed tower meets their requirements (ref. section IX, G3d of the Zoning Regulations).
2. A $50,000 bond shall be posted prior to construction to be used to remove the tower if abandoned per section IX, G7 of the Zoning Regulations.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James M. Hayden, First Selectman for the Town of East Granby, Gary Haynes, Zoning Enforcement Officer, Crown Castle, the tower owner, and Galasso Holdings LLC, the 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
cc:

James M. Hayden, First Selectman, Town of East Granby
9 Center Street
East Granby, Ct 06026
860.653.2576

Gary Haynes, Zoning Enforcement Officer, Town of East Granby
9 Center Street
East Granby, Ct 06026
860.653.2576

Galasso Holdings LLC, Property Owner
60 South Main St
East Granby, CT 06026

Crown Castle, Tower Owner

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
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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Exhibit A

Original Facility Approval

TOWN OF EAST GRANBY
PLANNING & ZONING COMMISSION
9 CENTER STREET
P.O. BOX 1858
EAST GRANBY, CT 06026
653-3444

November 29, 2000

Sprint Spectrum L.P. dba Sprint PCS
9 Barnes Industrial Road
Wallingford, CT 06492

CERTIFIED MAIL

Dear Sirs,

At its meeting on November 28, 2000, the East Granby Planning & Zoning Commission voted to approve your Application #00-20 for a communication tower on the Galasso Holdings property subject to the following conditions:

1. A letter of approval be provided from the FAA that the proposed tower meets their requirements (ref. section IX, G3d of the Zoning Regulations).
2. A $50,000 bond shall be posted prior to construction to be used to remove the tower if abandoned per section IX, G7 of the Zoning Regulations.

Sincerely,

Frederick O'Brien
Chairman

Cc: Town Clerk
Building Official
Town Engineer
Assessor
Attorney Thomas Regan

Exhibit B

Property card

60 SOUTH MAIN STREET

Location	60 SOUTH MAIN STREET	**Mblu**	11/ 11/ / /
Acct#		**Owner**	GALASSO HOLDINGS LLC
Assessment	$1,281,200	**Appraisal**	$1,830,100
PID	341	**Building Count**	3

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,293,500	$536,600	$1,830,100
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$905,600	$375,600	$1,281,200

Owner of Record

Owner	GALASSO HOLDINGS LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	PO BOX 1776 EAST GRANBY, CT 06026	**Book & Page**	0112/0814
		Sale Date	03/06/1997
		Instrument	

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
GALASSO HOLDINGS LLC	$0		0112/0814		03/06/1997

Building Information

Building 1 : Section 1

Year Built:	1969
Living Area:	43,230
Replacement Cost:	$933,768
Building Percent Good:	80
Replacement Cost Less Depreciation:	$747,000

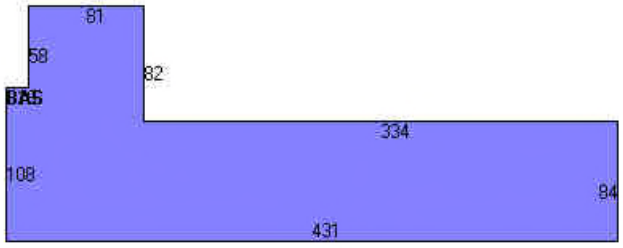
Building Attributes	
Field	**Description**

STYLE	Garage
MODEL	Commercial
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Gable/Hip
Roof Cover	Tar & Gravel
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	
Heating Fuel	Oil
Heating Type	Steam
AC Type	None
Bldg Use	Industrial MDL-94
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3-1C
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/EastGranbyCTPhotos//\00\00\20

Building Layout



(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	43,230	43,230
		43,230	43,230

Building 2 : Section 1

Year Built: 1969
Living Area: 5,720
Replacement Cost: $242,083
Building Percent Good: 80
Replacement Cost Less Depreciation: $193,700

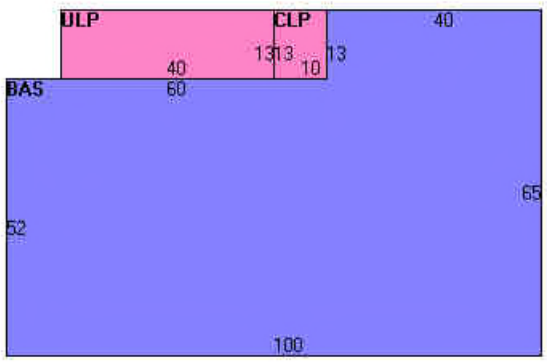
Building Attributes : Bldg 2 of 3	
Field	**Description**
STYLE	Light Indust
MODEL	Industrial
Grade	Average

Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Gable/Hip
Roof Cover	Asphalt
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	Minimum/Plywd
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Industrial MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3-1
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	10
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/EastGranbyCTPhotos//\00\00\20

Building Layout



(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	5,720	5,720
CLP	Loading Platform, Finished	130	0
ULP	Loading Platform, Unfinished	520	0
		6,370	5,720

Building 3 : Section 1

Year Built: 1972
Living Area: 8,000
Replacement Cost: $347,440
Building Percent Good: 80
Replacement Cost Less Depreciation: $278,000

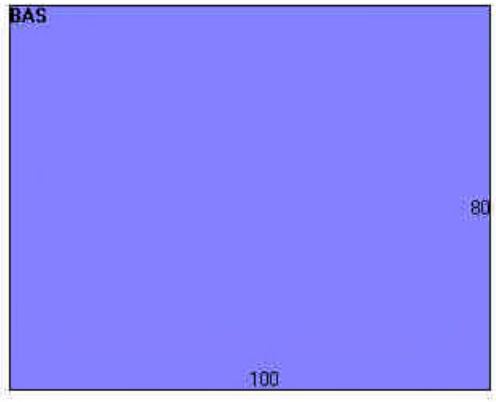
Building Attributes : Bldg 3 of 3	
Field	**Description**
STYLE	Light Indust

MODEL	Industrial
Grade	Average
Stories:	1
Occupancy	1
Exterior Wall A	Concr/Cinder
Exterior Wall B	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall A	Unfin/Minimum
Interior Wall B	
Interior Floor A	Concr-Finished
Interior Floor B	
Heating Fuel	Oil
Heating Type	Steam
AC Type	None
Bldg Use	Industrial MDL-96
Total Rooms	0
Total Bedrms	0
Total Baths	0
1st Floor Use:	
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/EastGranbyCTPhotos//default.jpg

Building Layout



(http://images.vgsi.com/photos/EastGranbyCTPhotos//Sketches/

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	8,000	8,000
		8,000	8,000

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
MEZ	Mezzanine	960 S.F.	$11,500	3

Land

Land Use

Use Code	3-1C
Description	Industrial MDL-94
Zone	I

Land Line Valuation

Size (Acres)	89.97
Frontage	0
Depth	0

Neighborhood		**Assessed Value**	$375,600
Alt Land Appr	No	**Appraised Value**	$536,600
Category			

Outbuildings

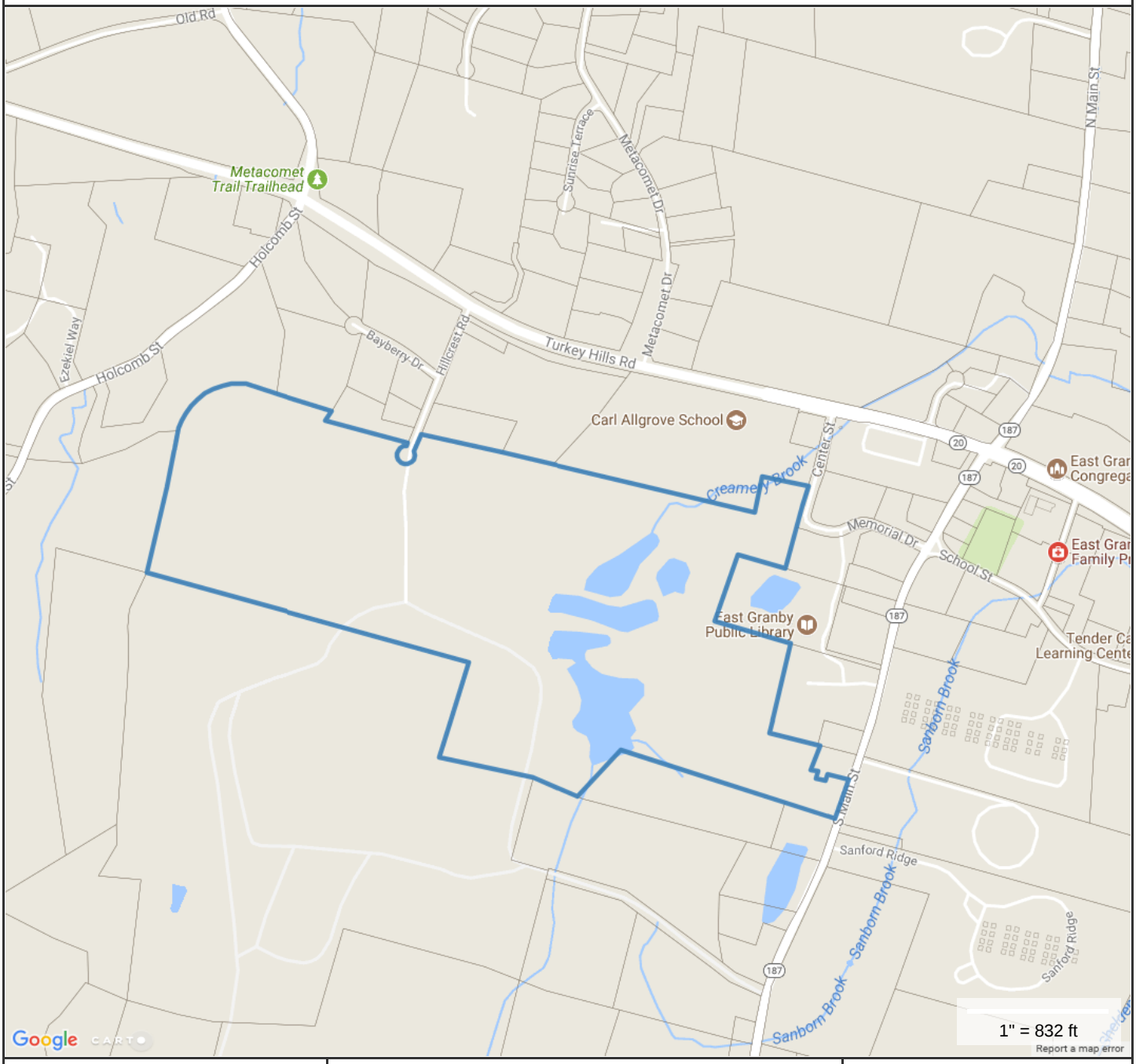
Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHED	Shed	A	Average	180 S.F.	$1,300	1
SHED	Shed	A	Average	640 S.F.	$3,500	2
LNT	Lean-To			350 S.F.	$1,400	1
SHED	Shed	A	Average	100 S.F.	$500	2
SHED	Shed	A	Average	200 S.F.	$3,600	3
LNT	Lean-To			240 S.F.	$1,000	2
SHED	Shed	A	Average	1250 S.F.	$11,300	1
GAR1	Garage	A	Average	1280 S.F.	$19,200	2
LNT	Lean-To			1472 S.F.	$8,800	1
SHED	Shed	A	Average	160 S.F.	$1,700	1
SHED	Shed	A	Average	252 S.F.	$1,400	2
SHED	Shed	A	Average	140 S.F.	$1,000	2
SHED	Shed	G	Good	360 S.F.	$8,600	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$1,409,400	$359,400	$1,768,800
2007	$818,700	$429,800	$1,248,500
2003	$1,010,400	$367,100	$1,377,500

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2012	$986,700	$251,600	$1,238,300
2007	$573,100	$300,900	$874,000
2003	$707,300	$256,900	$964,200

60 South Main Street, East Granby, CT



Property Information

Property ID	09003040-341
Location	60 SOUTH MAIN STREET
Owner	GALASSO HOLDINGS LLC

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
Working together for a better region.

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Exhibit C

Construction Drawings

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE PAGE
N1	NOTES
C1	PLAN & ELEVATION
C2	RF CHART AND ORIENTATION
D1	EQUIPMENT DETAILS
E1	GROUNDING & ELECTRICAL DETAILS
E2	RF PLUMBING DIAGRAM

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

876399

SITE ID

CT11542A

SITE NAME

E. GRANBY - SPRINT

SITE ADDRESS

60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

CONFIGURATION

67D04G

PROJECT SITE INFORMATION

SITE ID:	CT11542A
SITE NAME:	E. GRANBY – SPRINT
SITE ADDRESS:	60 SOUTH MAIN STREET EAST GRANBY, CT 06026
PERMITTING JURISDICTION:	TOWN OF EAST GRANBY
COUNTY:	HARTFORD
ZONING:	MFDR
SITE COORDINATES:	
LATITUDE:	41° 56' 30.0" (41.9416780000°) (NAD 83)
LONGITUDE:	-72° 44' 19.0" (-72.7386070000°) (NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

BASED ON THE STRUCTURAL ANALYSIS COMPLETED BY **B+T GROUP**, THE EXISTING TOWER IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION WITH THE FOLLOWING MODIFICATIONS:

- **CONTRACTOR TO INSTALL TOWER MODIFICATIONS AS DETAILED IN TOWER MODIFICATION DRAWINGS BT B+T GROUP FOR BU # 876399**

ANTENNA MOUNTS

BASED ON THE MOUNT ANALYSIS COMPLETED BY **MASER,** THE EXISTING ANTENNA MOUNTS ARE CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION

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 67D04G (CONNECTICUT MARKET) REPLACING (3) EXISTING ANTENNAS WITH NEW. MODELS. REMOVING (1) COAX LINE AND REPLACING WITH (1) HYBRID FIBER CABLE. ADDING (3) RRUS. REMOVING (3) BIAST. REPLACE (1) EXISTING CABINET WITH (1) NEW CABINET.

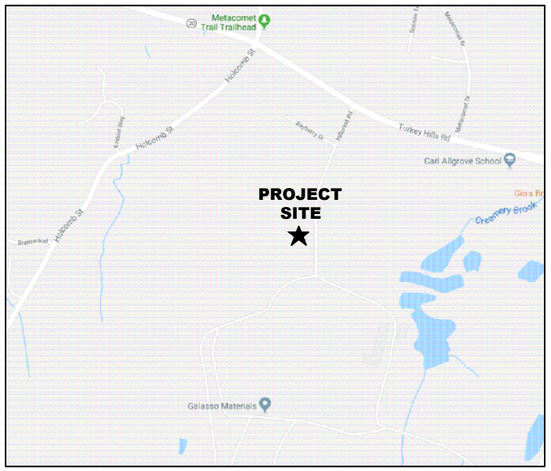
CURRENT INSTALL: (6) ANTENNAS, (12) COAX, (3) TMA'S, AND (3) BIAST. NO CHANGES MADE TO LEASED GROUND SPACE.

FINAL CONFIGURATION: (6) ANTENNAS, (11) COAX, (1) HYBRID FIBER CABLE, (3) TMA'S 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:

- 2018 CONNECTICUT STATE BUILDING CODE
- 2018 CONNECTICUT STATE FIRE SAFETY CODE
- 2015 INTERNATIONAL BUILDING CODE
- 2017 NATIONAL ELECTRICAL CODE (NFPA 70)
- 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. H
- 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 ENGINEERING, PLLC
1033 WATERVLIET SHAKER RD
ALBANY, NY 12205

STATE OF CONNECTICUT · TIMOTHY S. STEVENS · 24705 · 05/31/2019 · PROFESSIONAL ENGINEER

No.	Submittal / Revision	App'd	Date
2	CABLE COUNT	BWB	05/31/19
1	CT BUILDING CODE	BWB	05/07/19
0	ISSUED FOR CONSTRUCTION	BWB	03/28/19
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CT11542A
E. GRANBY - SPRINT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

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
24705
LICENSED PROFESSIONAL ENGINEER
05/31/2019

No.	Submittal / Revision	App'd	Date
2	CABLE COUNT	BWB	05/31/19
1	CT BUILDING CODE	BWB	05/07/19
0	ISSUED FOR CONSTRUCTION	BWB	03/28/19
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

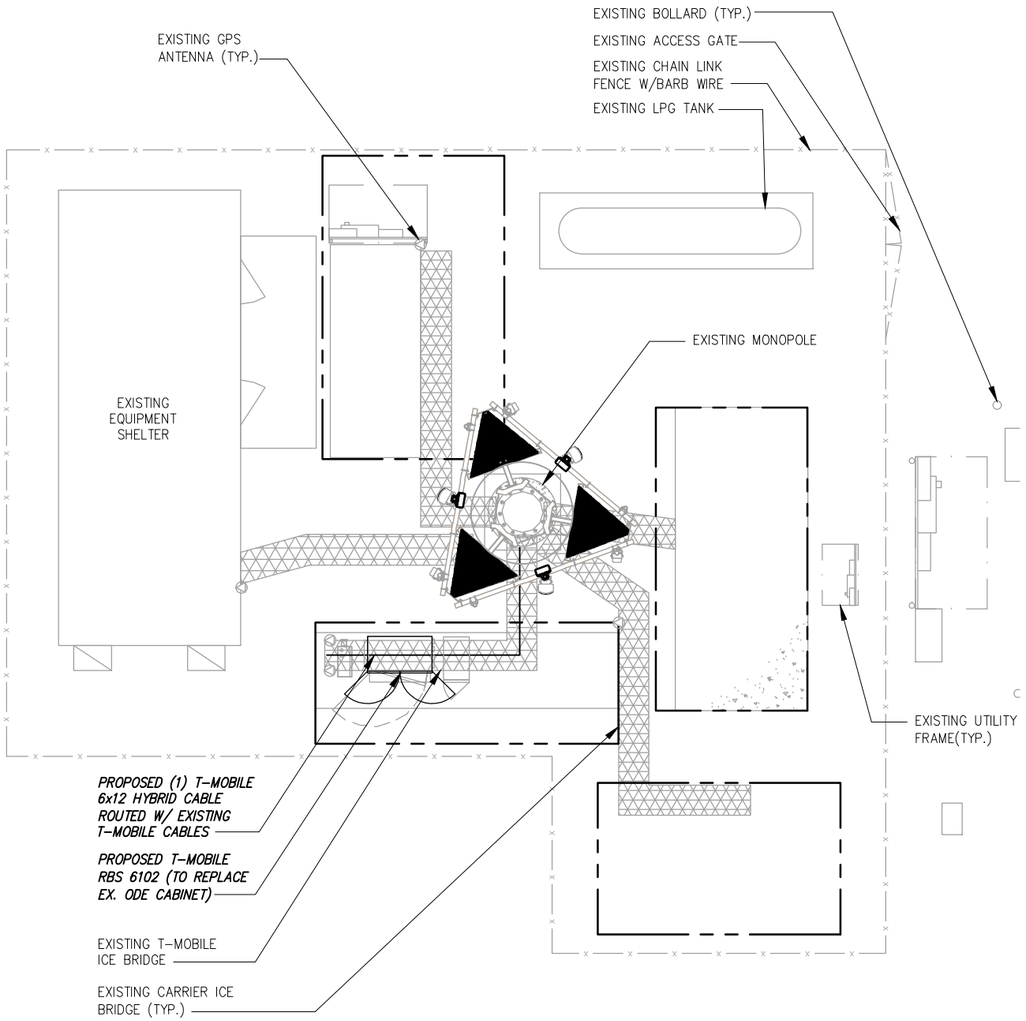
Project Number: 600-007

Project Title:
CT11542A
E. GRANBY - SPRINT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

Prepared For:
CROWN CASTLE

Drawing Title
NOTES

Drawing Number
N1



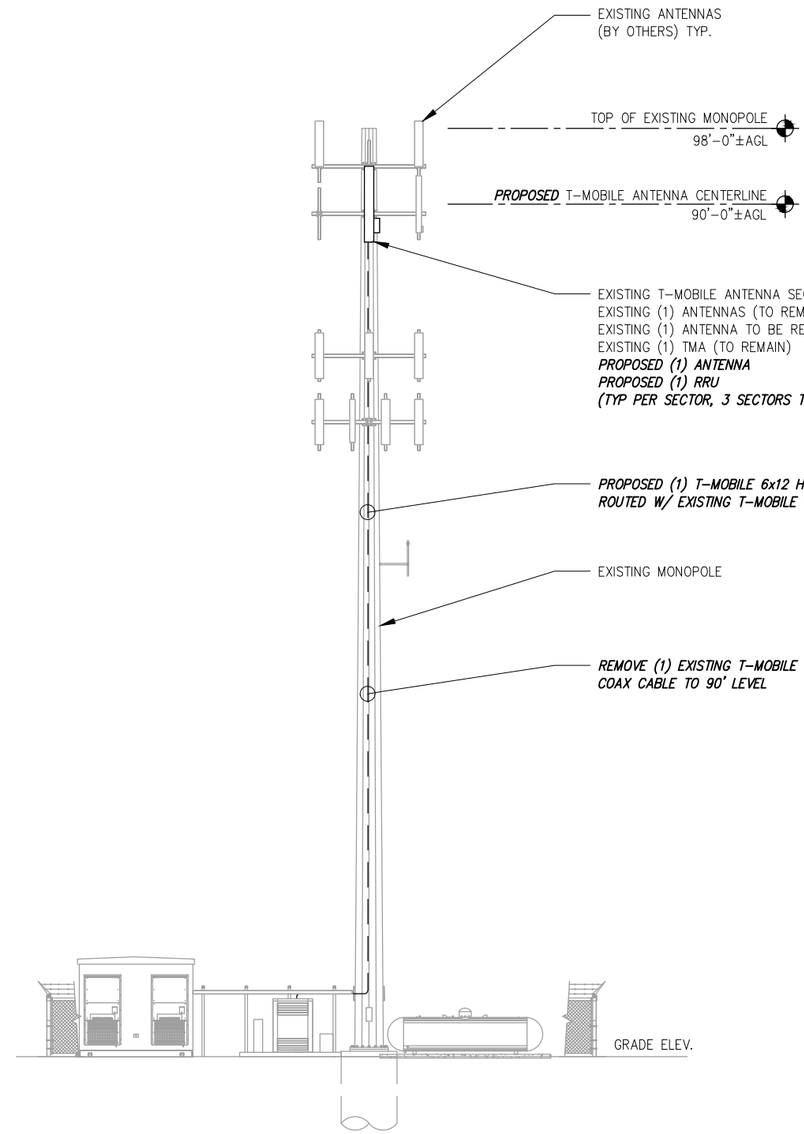
NORTH

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

T-Mobile
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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	APXV18-209014-C	RFS	60°	0	2	90'-0"	ATMPP1412D-1CWA	105'±	(4) 7/8" COAX
	A-2	**APXVAARR24_43-U-NA20**	**RFS**	**60°**	0	2/2	90'-0"	**RADIO 4449 B12/B71**	**105'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	A-3	-	-	-	-	-	-	-	-	-
BETA	B-1	APXV18-209014-C	RFS	180°	0	2	90'-0"	ATMPP1412D-1CWA	105'±	(4) 7/8" COAX
	B-2	**APXVAARR24_43-U-NA20**	**RFS**	**180°**	0	2/2	90'-0"	**RADIO 4449 B12/B71**	**105'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	B-3	-	-	-	-	-	-	-	-	-
GAMMA	C-1	APXV18-209014-C	RFS	300°	0	2	90'-0"	ATMPP1412D-1CWA	105'±	(3) 7/8" COAX
	C-2	**APXVAARR24_43-U-NA20**	**RFS**	**300°**	0	2/2	90'-0"	**RADIO 4449 B12/B71**	**105'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	C-3	-	-	-	-	-	-	-	-	-

1 / C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY

EXISTING
PROPOSED

ANTENNA LOCATION KEY

VIEWED FROM BEHIND

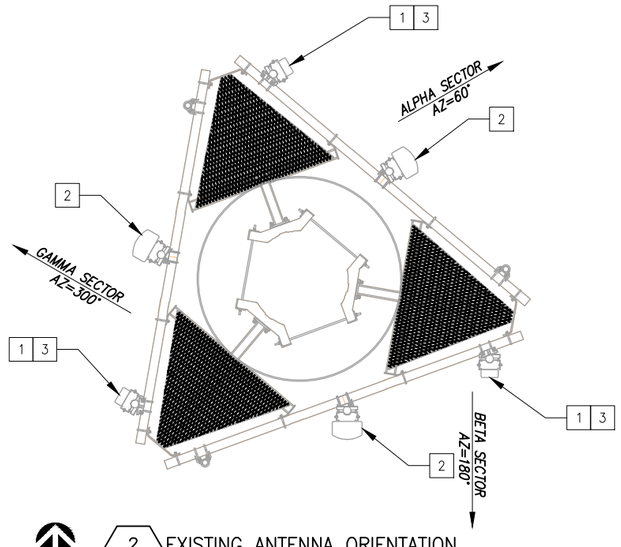
#1 #2 #3

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.

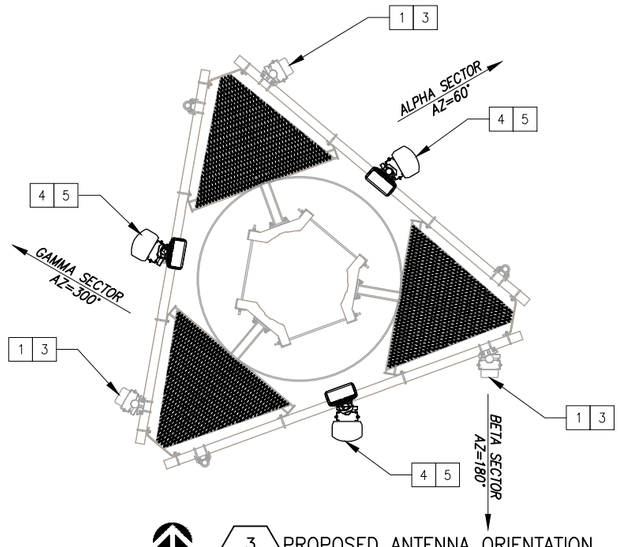
ORIENTATION PLAN KEY

KEY	DESCRIPTION	TYPE	QTY	STATUS
1	APXV18-209014-C	ANTENNA	3	REMAIN
2	LNX-6515DS-A1M	ANTENNA	3	REMOVED
3	ATMPP1412D-1CWA	TMA	3	REMAIN
4	**APXVAARR24_43-U-NA20**	**ANTENNA**	**3**	**PROPOSED**
5	**RADIO 4449 B12/B71**	**RRU**	**3**	**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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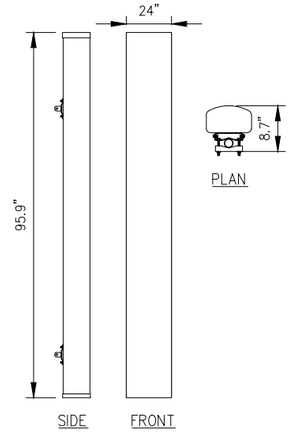
Prepared For: CROWN CASTLE

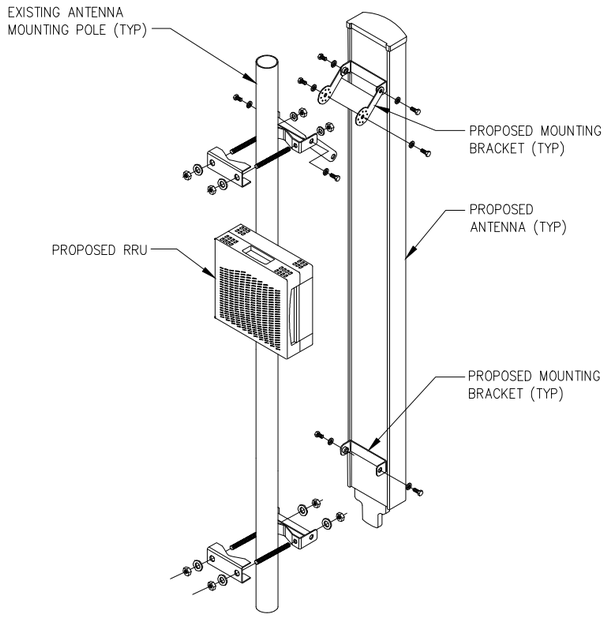
Drawing Title
RF CHART

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

APX ANTENNA DETAIL
1 / D1
SCALE: NOT TO SCALE

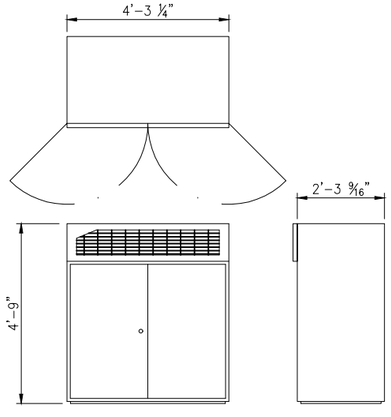


2 / D1 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE

ERICSSON RADIO 4449 B12/B71 SPECIFICATIONS

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

3 / D1 RRU DETAIL
SCALE: NOT TO SCALE



ERICSSON MODEL NO.:	RBS 6102
DIMENSIONS, HxWxD:	4'-9"x4'-3 1/4"x2'-3 9/16"
WEIGHT:	772 LBs (W/O BATTERIES)

4 / D1 CABINET DETAIL
SCALE: NOT TO SCALE

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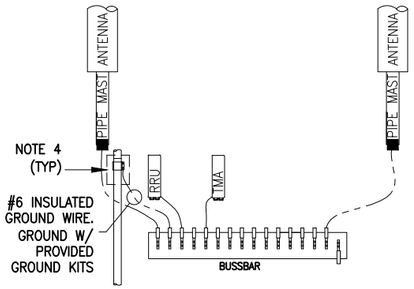
CROWN CASTLE

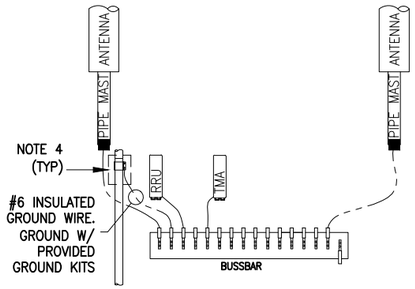
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

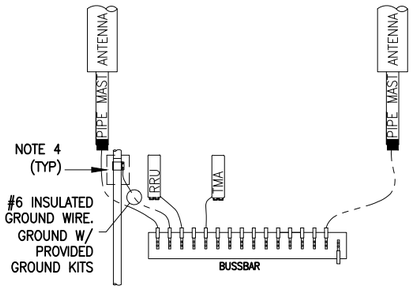
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

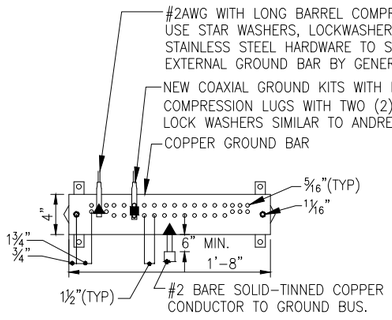


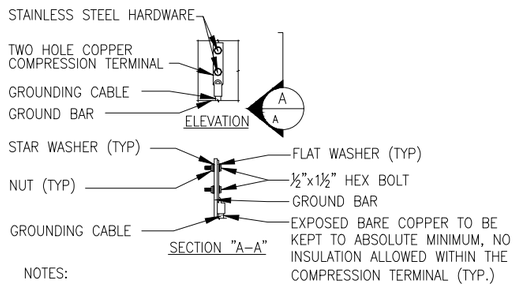
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



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

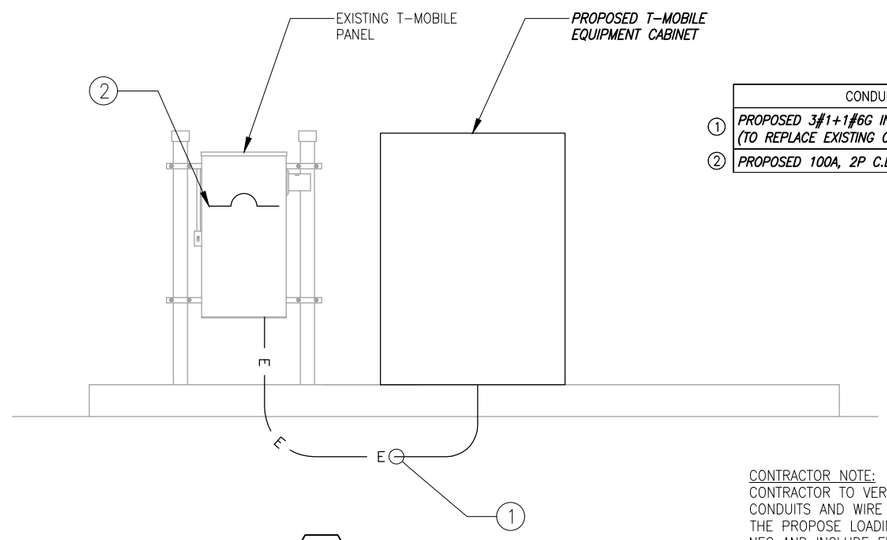




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

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 ENGINEERING, PLLC
1033 WATERVLIET SHAKER RD
ALBANY, NY 12205

STATE OF CONNECTICUT
JOHN S. STEVENS
24705
LICENSED PROFESSIONAL ENGINEER
05/31/2019

No.	Submittal / Revision	App'd	Date
2	CABLE COUNT	BWB	05/31/19
1	CT BUILDING CODE	BWB	05/07/19
0	ISSUED FOR CONSTRUCTION	BWB	03/28/19
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

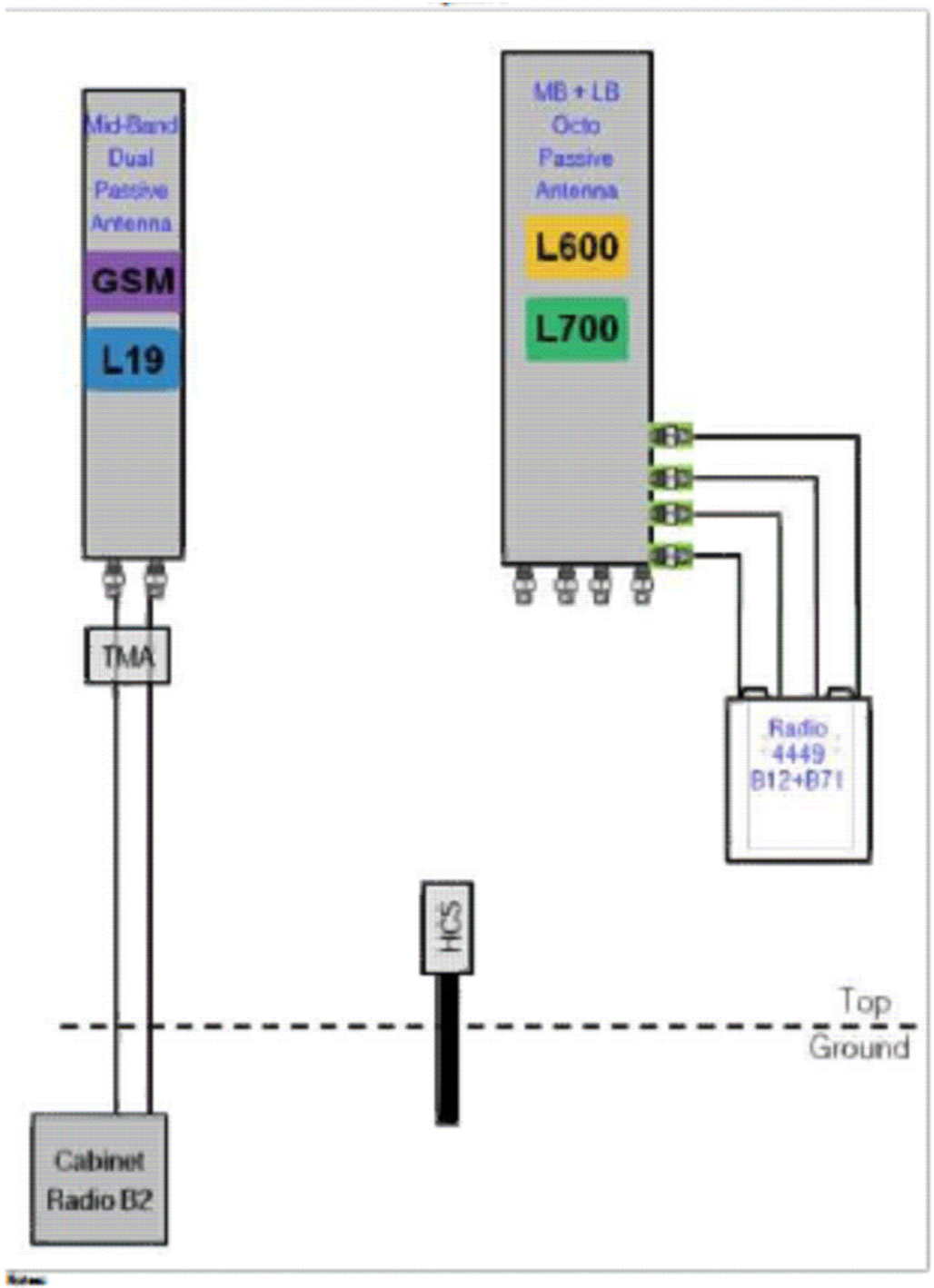
Project Number: 600-007

Project Title:
CT11542A
E. GRANBY - SPRINT
60 SOUTH MAIN STREET
EAST GRANBY, CT 06026

Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1



1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

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

INFINIGY ENGINEERING, PLLC
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EAST GRANBY, CT 06026

Prepared For:
CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

Exhibit D

Structural Analysis Report

Date: **June 13, 2019**

Mr. Charles Trask
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject:	**Structural Modification Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11542A
	Carrier Site Name:	E. Granby- Sprint
Crown Castle Designation:	**Crown Castle BU Number:**	876399
	Crown Castle Site Name:	(F) E. GRANBY 4Q2000 / Galasso
	Crown Castle JDE Job Number:	510433
	Crown Castle Work Order Number:	1677972
	Crown Castle Order Number:	444519 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	127643.004.01
Site Data:	**60 South Main St., East Granby, CT, Hartford County**	
	Latitude *41° 56' 29.59"*, Longitude *-72° 44' 19.248"*	
	98 Foot - Monopole	

Dear Mr. Trask,

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

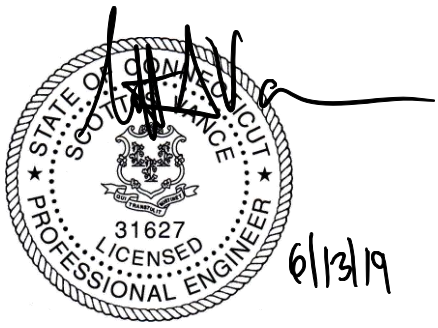
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Proposed Equipment with Proposed Modifications **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut Building code and the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Kishore Machani

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Exp: 02/10/20



Scott S. Vance, P.E.

tnxTower Report - version 8.0.5.0

TABLE OF CONTENTS

1) INTRODUCTION

This is 98 ft. monopole designed by Engineered Endeavors, Inc. in September of 2000. The monopole was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. This monopole has been modified by IETS in November of 2009, PJF in June of 2012 and GPD in July of 2015 and those modifications were incorporated in this analysis. The proposed modifications designed by B+T Group in November 2018 are considered in this Analysis

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.7 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)
89.0	90.0	3	Ericsson	RADIO 4449 B12/B71	1 11	1-3/8 7/8
		3	Rfs Celwave	APXV18-209014-C		
		3	Rfs Celwave	APXVAARR24_43-U-NA20		
		3	Rfs Celwave	ATMPP1412D-1CWA		
	89.0	1	--	Platform Mount [LP 305-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
94.0	97.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	3 1	1-1/4 7/8
		6	Alcatel Lucent	RRH2X50-800		
		3	Alcatel Lucent	TD-RRH8x20-25		
		3	Commscope	NNVV-65B-R4		
		3	Rfs Celwave	APXVTM14-ALU-I20		
	94.0	1	--	Platform Mount [LP 714-1]		
	98.0	1	Site Pro 1	HRK14-HD Handrail Kit		
74.0	77.0	1	Andrew	SBNH-1D6565C	2 1 12 2 1	3/4 3/8 7/8 3/4 3/8
		3	Cci Antennas	TPA-65R-LCUUUU-H8		
		3	Ericsson	RRUS 11 B12		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 32 B30		
		3	Kaelus	DBC0061F1V51-2		
		3	Powerwave Tech	7770.00		
		2	Powerwave Tech	P65-17-XLH-RR		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	Powerwave Tech	TT19-08BP111-001		
		2	Raycap	DC6-48-60-18-8F		
	74.0	1	--	Platform Mount [LP 303-1]		
67.0	67.0	3	Alcatel Lucent	B13 RRH 4X30	2 12	1-3/8 1-5/8
		3	Alcatel Lucent	B66A RRH4X45		
		6	Antel	LPA-80063/6CFX2		
		2	Commscope	RC2DC-3315-PF-48		
		6	Commscope	SBNHH-1D65B		
		1	--	Platform Mount [LP 303-1]		
52.0	54.0	1	Lucent	KS24019-L112A	1	7/8
	52.0	1	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	Sprint/Nextel Property Services Co-Locate, Rev.4	397084	CCI Sites
Tower Manufacturer Drawing	Engineered Endeavors, Inc. Job No. 7832-E01	1613691	CCI Sites
Foundation Drawings	Engineered Endeavors, Inc. , Project No.7832 Rev.1	2066334	CCI Sites
Geotech Report	DR. Clarence Welti, P.E., P.C, Date:07/25/2000	1531971	CCI Sites
	Delta Oaks Group, Project No. Geo18-03201-01	Date: 10/19/2018	CCI Sites
Tower Modification Drawing	IETS Project No. 2009-70644	2529017	CCI Sites
	Paul J. Ford & Company, Project No. 32912-0138 MO	3713021	CCI Sites
	GPD, Project No .2015777.876399.01	5803194	CCI Sites
Modification Inspection Report	IETS Project No. 2010-70158	2682749	CCI Sites
	Paul J. Ford & Company, Project No. 32912-0138 MO	3713020	CCI Sites
	ETS Project No. 160019	6139057	CCI Sites
Antenna Configuration	Crown CAD-Package	Date: 07/18/18	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.

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) (Monopole) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	98 - 93	Pole	TP13.078x12x0.1875	1	-3.421	-	11.1	Pass[1]
L2	93 - 88	Pole	TP14.156x13.078x0.1875	2	-5.621	-	29.0	Pass[1]
L3	88 - 85.21	Pole	TP15.28x14.156x0.1875	3	-5.770	-	40.0	Pass[1]
L4	85.21 - 80.21	Pole	TP15.445x14.383x0.25	4	-6.187	-	44.6	Pass[1]
L5	80.21 - 75.21	Pole	TP16.507x15.445x0.25	5	-6.571	-	53.9	Pass[1]
L6	75.21 - 70.21	Pole	TP17.568x16.507x0.25	6	-9.837	-	68.9	Pass[1]
L7	70.21 - 65.21	Pole	TP18.63x17.568x0.25	7	-12.847	-	81.5	Pass[1]
L8	65.21 - 60.21	Pole	TP19.692x18.63x0.25	8	-13.625	-	94.7	Pass[1]
L9	60.21 - 59.17	Pole	TP19.913x19.692x0.25	9	-13.788	-	97.1	Pass[1]
L10	59.17 - 58.9	Pole + Reinf.	TP19.97x19.913x0.5125	10	-13.866	-	88.0	Pass[1]
L11	58.9 - 58.75	Pole + Reinf.	TP20.002x19.97x0.5125	11	-13.895	-	88.4	Pass[1]
L12	58.75 - 54.08	Pole + Reinf.	TP20.993x20.002x0.5	12	-14.748	-	99.2	Pass[1]
L13	54.08 - 53.83	Pole + Reinf.	TP21.047x20.993x0.7	13	-14.824	-	74.6	Pass[1]
L14	53.83 - 52.91	Pole + Reinf.	TP21.242x21.047x0.7	14	-15.033	-	76.2	Pass[1]
L15	52.91 - 52.66	Pole + Reinf.	TP21.295x21.242x0.775	15	-15.105	-	68.9	Pass[1]
L16	52.66 - 52.17	Pole + Reinf.	TP21.399x21.295x0.775	16	-15.227	-	69.7	Pass[1]
L17	52.17 - 51.92	Pole + Reinf.	TP21.452x21.399x0.6875	17	-15.369	-	76.5	Pass[1]
L18	51.92 - 48.71	Pole + Reinf.	TP22.86x21.452x0.6625	18	-16.130	-	81.5	Pass[1]
L19	48.71 - 44.29	Pole + Reinf.	TP22.574x21.634x0.7375	19	-17.859	-	84.1	Pass[1]
L20	44.29 - 39.29	Pole + Reinf.	TP23.638x22.574x0.7125	20	-19.182	-	90.1	Pass[1]
L21	39.29 - 34.29	Pole + Reinf.	TP24.703x23.638x0.6875	21	-20.536	-	95.4	Pass[1]
L22	34.29 - 33.5	Pole + Reinf.	TP24.871x24.703x0.6875	22	-20.756	-	96.1	Pass[1]
L23	33.5 - 33.25	Pole + Reinf.	TP24.924x24.871x0.9875	23	-20.851	-	68.7	Pass[1]
L24	33.25 - 32	Pole + Reinf.	TP25.19x24.924x0.9875	24	-21.266	-	69.7	Pass[1]
L25	32 - 31.75	Pole + Reinf.	TP25.243x25.19x0.7625	25	-21.349	-	82.5	Pass[1]
L26	31.75 - 28.5	Pole + Reinf.	TP25.935x25.243x0.75	26	-22.293	-	85.2	Pass[1]
L27	28.5 - 28.25	Pole + Reinf.	TP25.988x25.935x1.0375	27	-22.397	-	63.8	Pass[1]
L28	28.25 - 27.75	Pole + Reinf.	TP26.094x25.988x1.0375	28	-22.576	-	64.2	Pass[1]
L29	27.75 - 27.5	Pole + Reinf.	TP26.148x26.094x1.2125	29	-22.677	-	61.0	Pass[1]
L30	27.5 - 27.25	Pole + Reinf.	TP26.201x26.148x0.9	30	-22.757	-	80.4	Pass[1]
L31	27.25 - 27.08	Pole + Reinf.	TP26.237x26.201x0.9	31	-22.813	-	80.6	Pass[1]
L32	27.08 - 26.83	Pole + Reinf.	TP26.29x26.237x0.7375	32	-22.883	-	86.5	Pass[1]
L33	26.83 - 21.83	Pole + Reinf.	TP27.354x26.29x0.725	33	-24.307	-	89.8	Pass[1]
L34	21.83 - 16.83	Pole + Reinf.	TP28.418x27.354x0.7	34	-25.771	-	92.8	Pass[1]
L35	16.83 - 15.45	Pole + Reinf.	TP28.712x28.418x0.7	35	-26.175	-	93.6	Pass[1]
L36	15.45 - 15.2	Pole + Reinf.	TP28.765x28.712x0.4875	36	-26.273	-	88.4	Pass[1]
L37	15.2 - 13.41	Pole + Reinf.	TP29.146x28.765x0.4875	37	-26.840	-	86.5	Pass[1]
L38	13.41 - 13.16	Pole + Reinf.	TP29.199x29.146x0.7125	38	-26.953	-	86.7	Pass[1]
L39	13.16 - 8.16	Pole + Reinf.	TP30.263x29.199x0.7	39	-28.567	-	89.3	Pass[1]
L40	8.16 - 6.5	Pole + Reinf.	TP30.617x30.263x0.4875	40	-29.073	-	90.1	Pass[1]
L41	6.5 - 6.25	Pole + Reinf.	TP30.67x30.617x0.4875	41	-29.179	-	87.0	Pass[1]

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L42	6.25 - 4.45	Pole + Reinf.	TP31.053x30.67x0.4875	42	-29.721	-	87.9	Pass[1]
L43	4.45 - 4.2	Pole + Reinf.	TP31.106x31.053x0.6625	43	-29.829	-	92.0	Pass[1]
L44	4.2 - 0	Pole + Reinf.	TP32x31.106x0.6625	44	-31.121	-	93.9	Pass[1]
							Summary	
						Pole (L12)	99.2	Pass[1]
						Rating =	**99.2**	**Pass[1]**

Table 5 - Tower Component Stresses vs. Capacity (Monopole) - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	56.7	Pass
1	Base Plate	Base	87.9	Pass
1	Base Foundation (Soil Interaction)	Base	85.6	Pass
1	Base Foundation (Steel)	Base	59.3	Pass

Structure Rating (max from all components) =	**99.2%**

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.

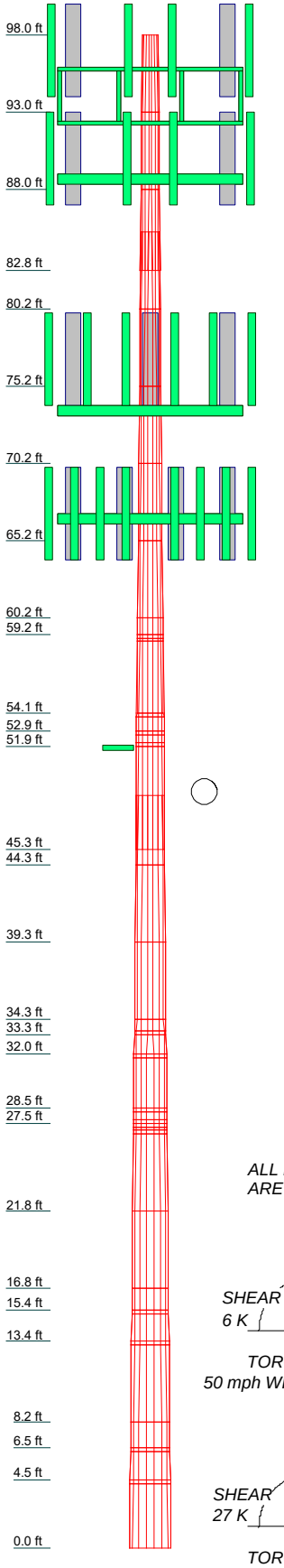
4.1) Recommendations

1. All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined capacity to be effective.

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	18	0.188		12.000	13.078		0.1
2	5.000	18	0.188		13.078	14.156		0.1
3	5.210	18	0.188	2.420	14.156	15.280		0.2
4	5.000	18	0.250		14.383	15.445		0.2
5	5.000	18	0.250		15.445	16.507		0.2
6	5.000	18	0.250		16.507	17.568		0.2
7	5.000	18	0.250		17.568	18.630		0.2
8	5.000	18	0.250		18.630	19.692		0.3
9	5.000	18	0.250		19.692	20.755		0.3
10	5.000	18	0.250		20.755	21.817		0.3
11	5.000	18	0.250		21.817	22.879		0.3
12	4.670	18	0.500		22.879	24.720		0.5
13	5.000	18	0.500		24.720	25.782		0.5
14	5.000	18	0.500		25.782	26.844		0.5
15	5.000	18	0.500		26.844	27.906		0.5
16	5.000	18	0.500		27.906	28.968		0.5
17	5.000	18	0.500		28.968	30.031		0.5
18	4.296	18	0.662	3.420	21.452	22.860	A572-65	1.0
19	4.296	18	0.738		21.634	22.574		0.7
20	5.000	18	0.713		22.574	23.638		0.8
21	5.000	18	0.688		23.638	24.703		0.9
22	5.000	18	0.688		24.703	25.767		0.9
23	5.000	18	0.688		25.767	26.831		0.9
24	5.000	18	0.688		26.831	27.895		0.9
25	5.000	18	0.688		27.895	28.959		0.9
26	5.000	18	0.750		28.959	30.023		0.9
27	5.000	18	0.750		30.023	31.087		0.9
28	5.000	18	0.750		31.087	32.151		0.9
29	5.000	18	0.750		32.151	33.215		0.9
30	5.000	18	0.750		33.215	34.279		0.9
31	5.000	18	0.750		34.279	35.343		0.9
32	5.000	18	0.750		35.343	36.407		0.9
33	5.000	18	0.725		26.290	27.354		0.9
34	5.000	18	0.700		27.354	28.418		0.9
35	5.000	18	0.700		28.418	29.481		0.9
36	5.000	18	0.700		29.481	30.545		0.9
37	5.000	18	0.700		30.545	31.609		0.9
38	5.000	18	0.700		31.609	32.673		0.9
39	5.000	18	0.750		29.201	30.266		1.1
40	5.000	18	0.650		30.266	31.266		0.9
41	5.000	18	0.650		31.266	32.266		0.9
42	5.000	18	0.650		32.266	33.266		0.9
43	5.000	18	0.650		33.266	34.266		0.9
44	4.200	18	0.775		31.106	32.000		1.0



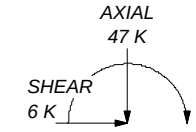
DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Miscellaneous [NA 510-1] (R-Handrail Kit)	98	7770.00 w/ Mount Pipe (E)	74
APXVTM14-ALU-I20 w/ Mount Pipe (R)	94	P65-17-XLH-RR w/ Mount Pipe (E)	74
APXVTM14-ALU-I20 w/ Mount Pipe (R)	94	P65-17-XLH-RR w/ Mount Pipe (E)	74
NNVV-65B-R4 w/ Mount Pipe (R)	94	TT19-08BP111-001 (E)	74
NNVV-65B-R4 w/ Mount Pipe (R)	94	TT19-08BP111-001 (E)	74
NNVV-65B-R4 w/ Mount Pipe (R)	94	TT19-08BP111-001 (E)	74
(2) RRH2X50-800 (R)	94	DC6-48-60-18-8F (E)	74
(2) RRH2X50-800 (R)	94	TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	74
(2) RRH2X50-800 (R)	94	TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	74
PCS 1900MHz 4x45W-65MHz (R)	94	TPA-65R-LCUUUU-H8 w/ Mount Pipe (R)	74
PCS 1900MHz 4x45W-65MHz (R)	94	SBNH-1D6565C w/ Mount Pipe (R)	74
PCS 1900MHz 4x45W-65MHz (R)	94	RRUS 11 B12 (R)	74
TD-RRH8x20-25 (R)	94	RRUS 11 B12 (R)	74
TD-RRH8x20-25 (R)	94	RRUS 11 B12 (R)	74
TD-RRH8x20-25 (R)	94	RRUS 32 B30 (R)	74
9' x 2" Pipe Mount (E-per Photo)	94	RRUS 32 B30 (R)	74
9' x 2" Pipe Mount (E-per Photo)	94	RRUS 32 B30 (R)	74
9' x 2" Pipe Mount (E-per Photo)	94	RRUS 32 B2 (R)	74
4'x2" Horizontal Mount Pipe (R-Handrail Support)	94	RRUS 32 B2 (R)	74
4'x2" Horizontal Mount Pipe (R-Handrail Support)	94	RRUS 32 B2 (R)	74
4'x2" Horizontal Mount Pipe (R-Handrail Support)	94	DBC0061F1V51-2 (R)	74
APXVTM14-ALU-I20 w/ Mount Pipe (R)	94	DBC0061F1V51-2 (R)	74
Platform Mount [LP 714-1] (E-Area changed to 14' Mount)	94	DBC0061F1V51-2 (R)	74
APXV18-209014-C w/ Mount Pipe (E)	89	DC6-48-60-18-8F (R)	74
APXV18-209014-C w/ Mount Pipe (E)	89	3' x 2" Pipe Mount (E-For DC6 Per Photo)	74
APXV18-209014-C w/ Mount Pipe (E)	89	Platform Mount [LP 303-1] (E)	74
ATMPP1412D-1CWA (E)	89	(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	67
ATMPP1412D-1CWA (E)	89	(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	67
ATMPP1412D-1CWA (E)	89	(2) LPA-80063/6CFX2 w/ Mount Pipe (E)	67
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	89	(2) SBNHH-1D65B w/ Mount Pipe (R)	67
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	89	(2) SBNHH-1D65B w/ Mount Pipe (R)	67
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	89	(2) SBNHH-1D65B w/ Mount Pipe (R)	67
RADIO 4449 B12/B71 (P)	89	B13 RRH 4X30 (R)	67
RADIO 4449 B12/B71 (P)	89	B13 RRH 4X30 (R)	67
RADIO 4449 B12/B71 (P)	89	B13 RRH 4X30 (R)	67
6' x 2" Mount Pipe (E)	89	B66A RRH4X45 (R)	67
6' x 2" Mount Pipe (E)	89	B66A RRH4X45 (R)	67
6' x 2" Mount Pipe (E)	89	B66A RRH4X45 (R)	67
Platform Mount [LP 305-1] (E)	89	RC2DC-3315-PF-48 (R)	67
7770.00 w/ Mount Pipe (E)	74	RC2DC-3315-PF-48 (R)	67
7770.00 w/ Mount Pipe (E)	74	Platform Mount [LP 303-1] (E)	67
		Miscellaneous [NA 509-3] (E-Photo)	67
		KS24019-L112A (E)	52
		Side Arm Mount [SO 701-1] (E)	52

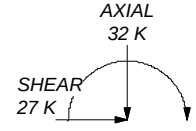
MATERIAL STRENGTH

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

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 1.000 in I



TORQUE 1 kip-ft
REACTIONS - 120 mph WIND

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 99.2%

B+T GRP
B+T Group

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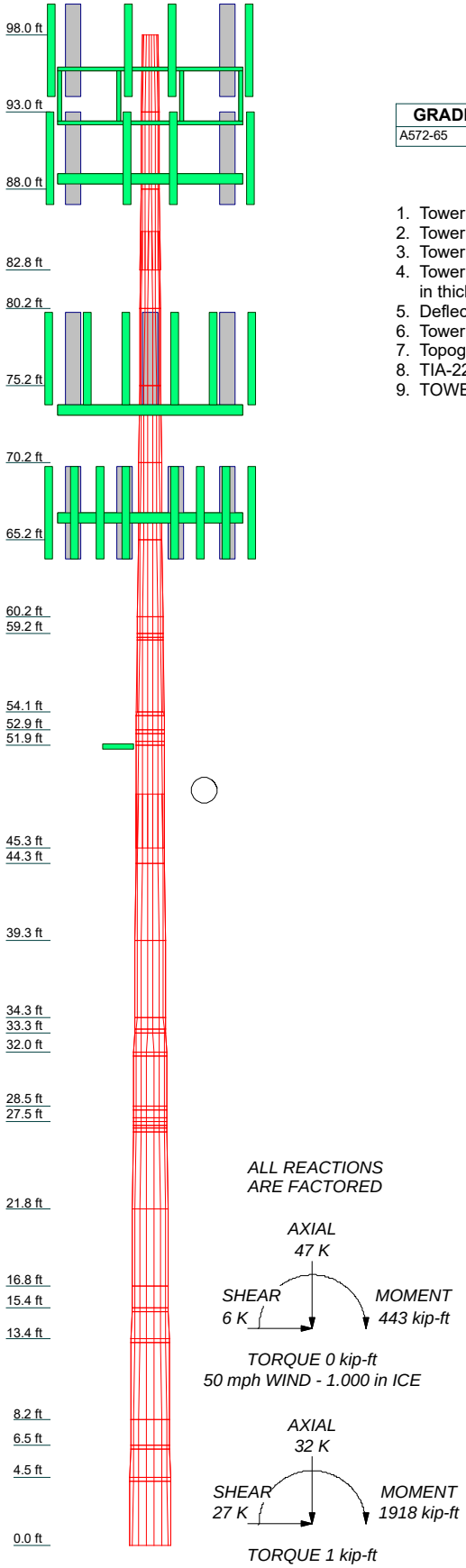
1717 S. Boulder, Suite 300.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 587- 0265

Job: **127643.004.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639**

Project:		
Client: Crown Castle	Drawn by: kmachani	App'd:
Code: TIA-222-H	Date: 01/17/19	Scale: NTS
Path:		Dwg No. E-1

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Length (ft)	5.000	5.000	5.210	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.670	5.000	5.000	5.000	5.000	5.000	4.420	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	4.200
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.188	0.188	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.500	0.500	0.500	0.500	0.500	0.500	0.662	0.738	0.713	0.688	0.663	0.638	0.613	0.588	0.750	0.725	0.700	0.675	0.650	0.625	0.600	0.725	0.700	0.675	0.650	0.625	0.600	0.750	0.725	0.700	0.675	0.650	0.775
Socket Length (ft)			2.420															3.420																												
Top Dia (in)	12.000	13.078	14.156	14.383	15.445	16.507	17.568	18.630	19.692	20.754	21.816	22.320	23.382	24.444	25.506	26.568	27.630	21.452	21.634	22.574	23.638	24.703	25.767	26.831	27.895	28.959	26.290	27.354	28.418	29.482	30.546	31.610	26.290	27.354	28.418	29.482	30.546	31.610	29.201	30.266	31.330	32.394	33.458	34.522
Bot Dia (in)	13.078	14.156	15.280	15.445	16.507	17.568	18.630	19.692	20.754	21.816	22.878	23.382	24.444	25.506	26.568	27.630	28.692	22.860	22.574	23.638	24.703	25.767	26.831	27.895	28.959	30.023	27.354	28.418	29.482	30.546	31.610	32.674	27.354	28.418	29.482	30.546	31.610	32.674	30.266	31.330	32.394	33.458	34.522	35.586
Grade	A572-65																																												
Weight (K)	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.5	0.0	0.0	0.0	0.0	0.0	1.0	0.7	0.8	0.9	0.1	0.1	0.1	0.1	0.6	0.9	0.9	0.3	0.4	0.5	0.5	0.9	0.9	0.3	0.4	0.5	0.5	1.1	0.4	0.5	0.5	0.5	1.0



ALL REACTIONS ARE FACTORED

AXIAL 47 K
SHEAR 6 K
MOMENT 443 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL 32 K
SHEAR 27 K
MOMENT 1918 kip-ft
TORQUE 1 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 99.2%

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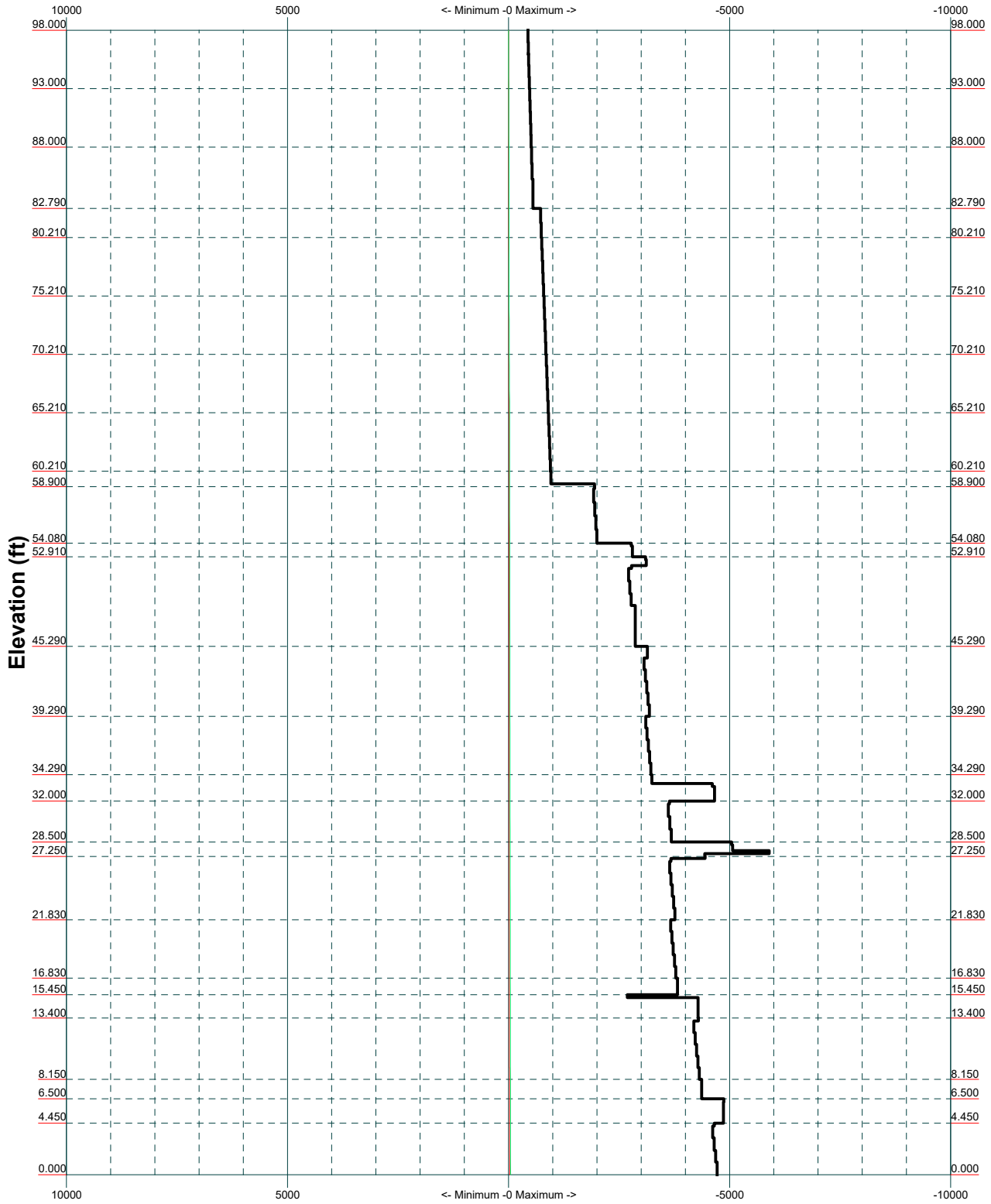
Job: 127643.004.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639			
Project:			
Client: Crown Castle	Drawn by: kmachani	App'd:	
Code: TIA-222-H	Date: 01/17/19	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 120 mph/50 mph 1.000 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



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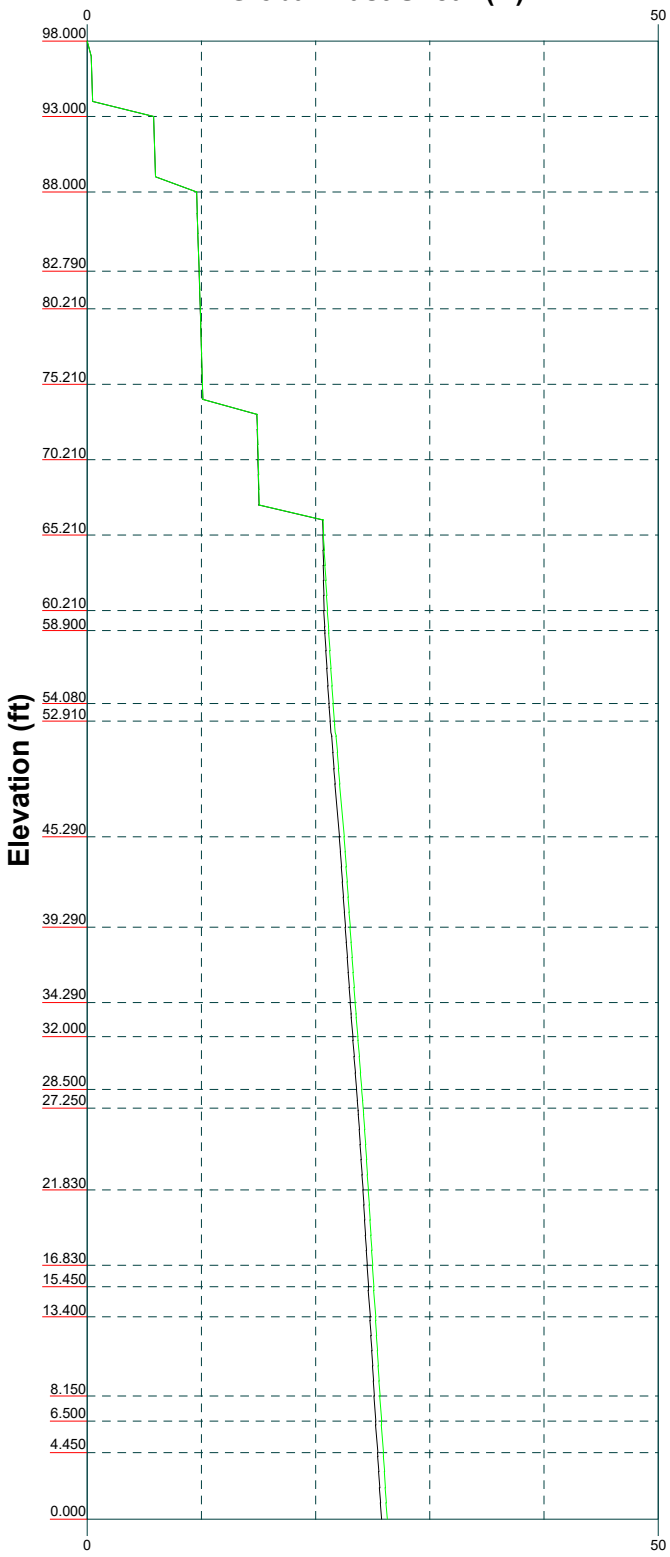
Project:			
Client: Crown Castle	Drawn by: kmachani	App'd:	
Code: TIA-222-H	Date: 01/17/19	Scale: NTS	
Path:		Dwg No. E-3	

TIA-222-H - 120 mph/50 mph 1.000 in Ice Exposure C

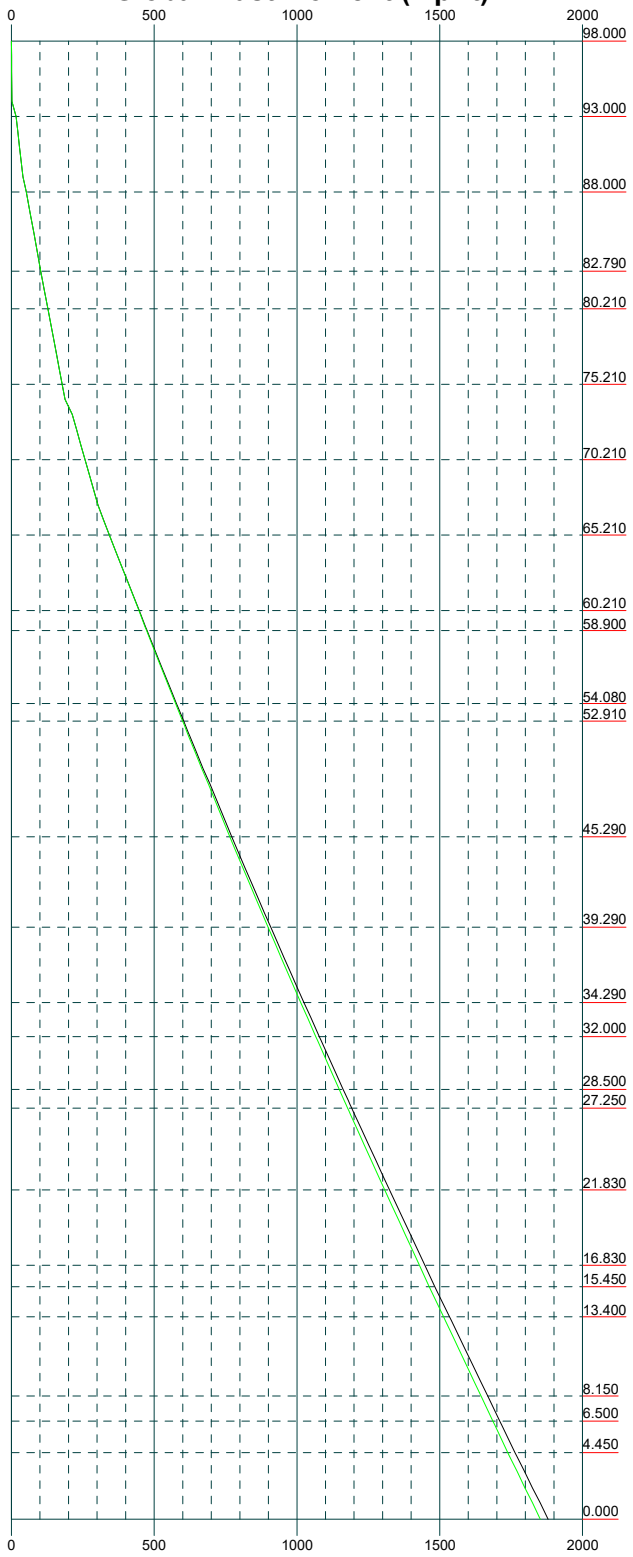
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)



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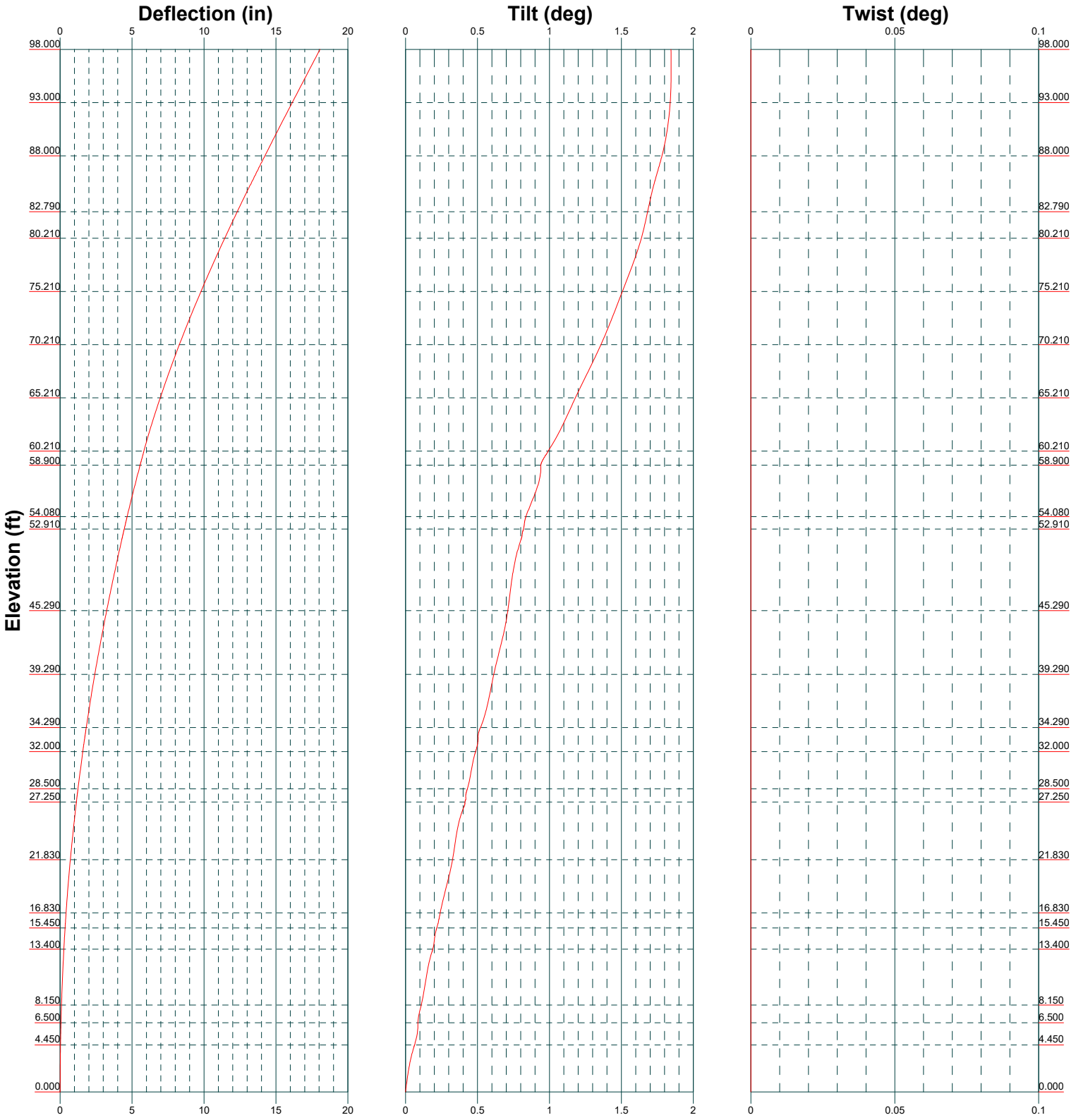
Project:		
Client: Crown Castle	Drawn by: kmachani	App'd:
Code: TIA-222-H	Date: 01/17/19	Scale: NTS
Path:		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values



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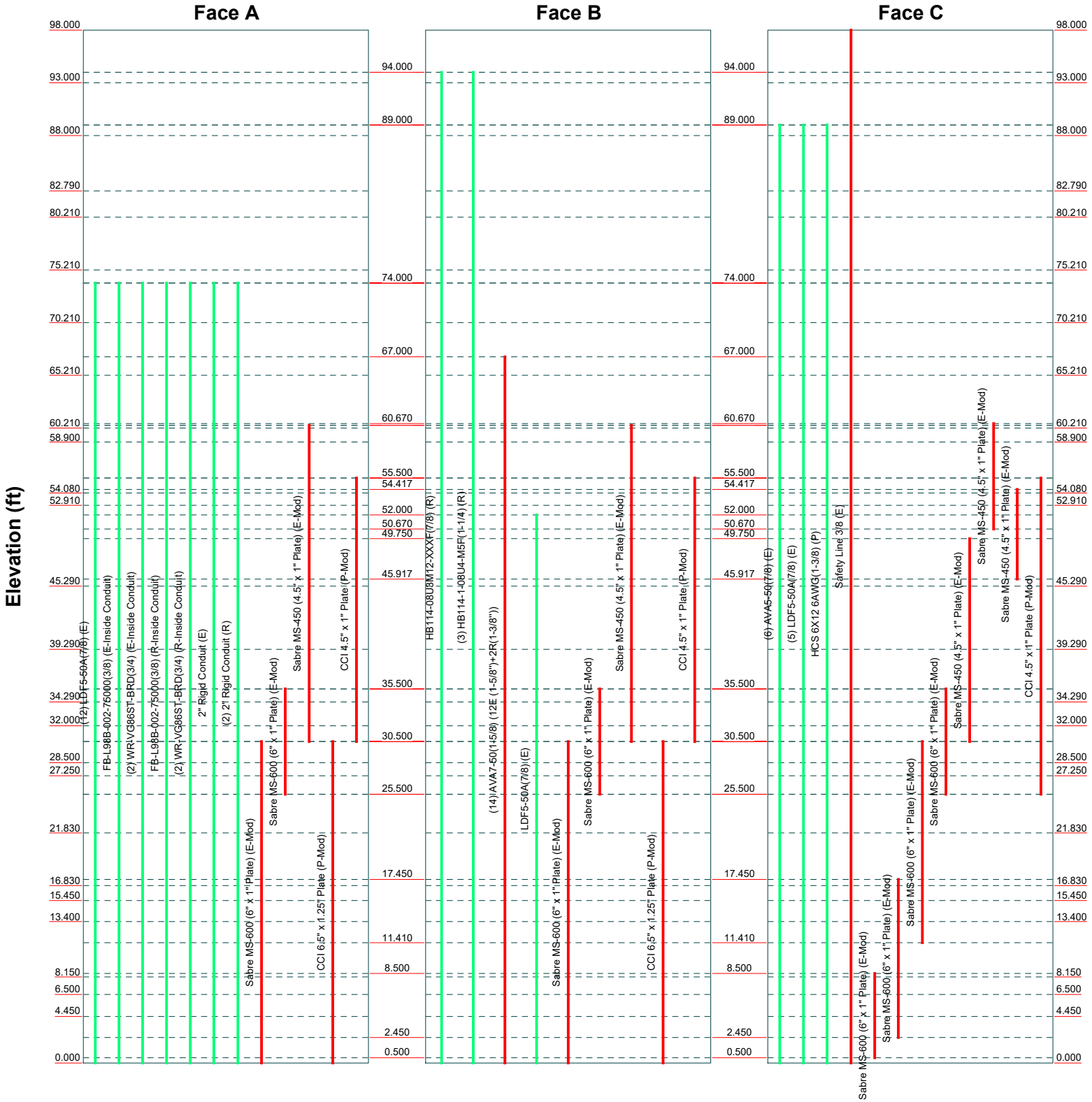
Job: ***127643.004.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639***			
Project:			
Client: Crown Castle	Drawn by: kmachani	App'd:	
Code: TIA-222-H	Date: 01/17/19	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 98'

Round | Flat | App In Face | App Out Face | Truss Leg



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Job: 127643.004.01 - (F) E. GRANBY 4Q2000 / GALASSO, CT (BU# 87639			
Project:			
Client: Crown Castle	Drawn by: kmachani	App'd:	
Code: TIA-222-H	Date: 01/17/19	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 256.000 ft.
Basic wind speed of 120 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.000 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.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	98.000-93.000	5.000	0.000	18	12.000	13.078	0.188	0.750	A572-65 (65 ksi)
L2	93.000-88.000	5.000	0.000	18	13.078	14.156	0.188	0.750	A572-65 (65 ksi)
L3	88.000-82.790	5.210	2.420	18	14.156	15.280	0.188	0.750	A572-65 (65 ksi)
L4	82.790-80.210	5.000	0.000	18	14.383	15.445	0.250	1.000	A572-65 (65 ksi)
L5	80.210-75.210	5.000	0.000	18	15.445	16.507	0.250	1.000	A572-65 (65 ksi)
L6	75.210-70.210	5.000	0.000	18	16.507	17.568	0.250	1.000	A572-65 (65 ksi)
L7	70.210-65.210	5.000	0.000	18	17.568	18.630	0.250	1.000	A572-65 (65 ksi)
L8	65.210-60.210	5.000	0.000	18	18.630	19.692	0.250	1.000	A572-65 (65 ksi)
L9	60.210-59.170	1.040	0.000	18	19.692	19.913	0.250	1.000	A572-65 (65 ksi)
L10	59.170-58.900	0.270	0.000	18	19.913	19.970	0.512	2.050	A572-65 (65 ksi)
L11	58.900-58.750	0.150	0.000	18	19.970	20.002	0.512	2.050	A572-65 (65 ksi)
L12	58.750-54.080	4.670	0.000	18	20.002	20.993	0.500	2.000	A572-65 (65 ksi)
L13	54.080-53.830	0.250	0.000	18	20.993	21.047	0.700	2.800	A572-65 (65 ksi)
L14	53.830-52.910	0.920	0.000	18	21.047	21.242	0.700	2.800	A572-65 (65 ksi)
L15	52.910-52.660	0.250	0.000	18	21.242	21.295	0.775	3.100	A572-65 (65 ksi)
L16	52.660-52.170	0.490	0.000	18	21.295	21.399	0.775	3.100	A572-65 (65 ksi)
L17	52.170-51.920	0.250	0.000	18	21.399	21.452	0.688	2.750	A572-65 (65 ksi)
L18	51.920-45.290	6.630	3.420	18	21.452	22.860	0.662	2.650	A572-65 (65 ksi)
L19	45.290-44.290	4.420	0.000	18	21.634	22.574	0.738	2.950	A572-65 (65 ksi)
L20	44.290-39.290	5.000	0.000	18	22.574	23.638	0.713	2.850	A572-65 (65 ksi)
L21	39.290-34.290	5.000	0.000	18	23.638	24.703	0.688	2.750	A572-65 (65 ksi)
L22	34.290-33.500	0.790	0.000	18	24.703	24.871	0.688	2.750	A572-65 (65 ksi)
L23	33.500-33.250	0.250	0.000	18	24.871	24.924	0.988	3.950	A572-65 (65 ksi)
L24	33.250-32.000	1.250	0.000	18	24.924	25.190	0.988	3.950	A572-65 (65 ksi)
L25	32.000-31.750	0.250	0.000	18	25.190	25.243	0.762	3.050	A572-65 (65 ksi)
L26	31.750-28.500	3.250	0.000	18	25.243	25.935	0.750	3.000	A572-65 (65 ksi)
L27	28.500-28.250	0.250	0.000	18	25.935	25.988	1.038	4.150	A572-65 (65 ksi)
L28	28.250-27.750	0.500	0.000	18	25.988	26.094	1.038	4.150	A572-65 (65 ksi)
L29	27.750-27.500	0.250	0.000	18	26.094	26.148	1.212	4.850	A572-65 (65 ksi)

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
L30	27.500-27.250	0.250	0.000	18	26.148	26.201	0.900	3.600	A572-65 (65 ksi)
L31	27.250-27.080	0.170	0.000	18	26.201	26.237	0.900	3.600	A572-65 (65 ksi)
L32	27.080-26.830	0.250	0.000	18	26.237	26.290	0.738	2.950	A572-65 (65 ksi)
L33	26.830-21.830	5.000	0.000	18	26.290	27.354	0.725	2.900	A572-65 (65 ksi)
L34	21.830-16.830	5.000	0.000	18	27.354	28.418	0.700	2.800	A572-65 (65 ksi)
L35	16.830-15.450	1.380	0.000	18	28.418	28.712	0.700	2.800	A572-65 (65 ksi)
L36	15.450-15.200	0.250	0.000	18	28.712	28.765	0.487	1.950	A572-65 (65 ksi)
L37	15.200-13.400	1.800	0.000	18	28.765	29.148	0.775	3.100	A572-65 (65 ksi)
L38	13.400-13.150	0.250	0.000	18	29.148	29.201	0.775	3.100	A572-65 (65 ksi)
L39	13.150-8.150	5.000	0.000	18	29.201	30.266	0.750	3.000	A572-65 (65 ksi)
L40	8.150-6.500	1.650	0.000	18	30.266	30.617	0.750	3.000	A572-65 (65 ksi)
L41	6.500-6.250	0.250	0.000	18	30.617	30.670	0.838	3.350	A572-65 (65 ksi)
L42	6.250-4.450	1.800	0.000	18	30.670	31.053	0.825	3.300	A572-65 (65 ksi)
L43	4.450-4.200	0.250	0.000	18	31.053	31.106	0.787	3.150	A572-65 (65 ksi)
L44	4.200-0.000	4.200		18	31.106	32.000	0.775	3.100	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.156	7.030	123.928	4.193	6.096	20.329	248.020	3.516	1.782	9.504
	13.251	7.672	161.057	4.576	6.644	24.242	322.325	3.837	1.972	10.516
L2	13.251	7.672	161.057	4.576	6.644	24.242	322.325	3.837	1.972	10.516
	14.346	8.313	204.946	4.959	7.191	28.498	410.162	4.157	2.162	11.528
L3	14.346	8.313	204.946	4.959	7.191	28.498	410.162	4.157	2.162	11.528
	15.487	8.982	258.481	5.358	7.762	33.300	517.303	4.492	2.359	12.583
L4	15.088	11.215	283.009	5.017	7.307	38.733	566.390	5.608	2.091	8.366
	15.645	12.057	351.702	5.394	7.846	44.826	703.867	6.030	2.278	9.113
L5	15.645	12.057	351.702	5.394	7.846	44.826	703.867	6.030	2.278	9.113
	16.723	12.900	430.698	5.771	8.385	51.363	861.964	6.451	2.465	9.861
L6	16.723	12.900	430.698	5.771	8.385	51.363	861.964	6.451	2.465	9.861
	17.801	13.742	520.718	6.148	8.925	58.346	1042.120	6.872	2.652	10.608
L7	17.801	13.742	520.718	6.148	8.925	58.346	1042.120	6.872	2.652	10.608
	18.879	14.585	622.480	6.525	9.464	65.773	1245.778	7.294	2.839	11.356
L8	18.879	14.585	622.480	6.525	9.464	65.773	1245.778	7.294	2.839	11.356
	19.957	15.427	736.704	6.902	10.003	73.645	1474.378	7.715	3.026	12.103
L9	19.957	15.427	736.704	6.902	10.003	73.645	1474.378	7.715	3.026	12.103
	20.181	15.602	762.095	6.980	10.116	75.338	1525.194	7.803	3.065	12.258
L10	20.141	31.558	1500.556	6.887	10.116	148.341	3003.087	15.782	2.603	5.078
	20.199	31.651	1513.900	6.907	10.145	149.230	3029.791	15.828	2.613	5.098
L11	20.199	31.651	1513.900	6.907	10.145	149.230	3029.791	15.828	2.613	5.098

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
	20.231	31.703	1521.347	6.919	10.161	149.725	3044.695	15.854	2.618	5.109
L12	20.233	30.949	1487.098	6.923	10.161	146.355	2976.153	15.478	2.640	5.281
	21.240	32.523	1725.684	7.275	10.665	161.813	3453.638	16.265	2.815	5.63
L13	21.209	45.088	2345.912	7.204	10.665	219.970	4694.910	22.548	2.463	3.518
	21.263	45.206	2364.370	7.223	10.692	221.142	4731.852	22.607	2.472	3.532
L14	21.263	45.206	2364.370	7.223	10.692	221.142	4731.852	22.607	2.472	3.532
	21.462	45.640	2433.131	7.292	10.791	225.480	4869.465	22.824	2.507	3.581
L15	21.450	50.346	2664.426	7.266	10.791	246.914	5332.357	25.178	2.375	3.064
	21.504	50.476	2685.212	7.285	10.818	248.220	5373.957	25.243	2.384	3.076
L16	21.504	50.476	2685.212	7.285	10.818	248.220	5373.957	25.243	2.384	3.076
	21.610	50.732	2726.267	7.322	10.871	250.790	5456.121	25.371	2.402	3.1
L17	21.623	45.195	2449.375	7.353	10.871	225.319	4901.973	22.602	2.556	3.718
	21.677	45.311	2468.258	7.371	10.898	226.494	4939.763	22.660	2.566	3.732
L18	21.681	43.716	2387.104	7.380	10.898	219.047	4777.349	21.862	2.610	3.939
	23.110	46.676	2905.644	7.880	11.613	250.209	5815.112	23.343	2.857	4.313
L19	22.593	48.915	2698.442	7.418	10.990	245.537	5400.434	24.462	2.510	3.403
	22.809	51.116	3079.502	7.752	11.468	268.535	6163.055	25.563	2.675	3.627
L20	22.813	49.440	2985.342	7.761	11.468	260.324	5974.611	24.725	2.719	3.816
	23.893	51.847	3442.816	8.139	12.008	286.702	6890.161	25.928	2.906	4.079
L21	23.897	50.082	3332.895	8.148	12.008	277.548	6670.175	25.046	2.950	4.291
	24.978	52.404	3818.287	8.525	12.549	304.273	7641.599	26.207	3.138	4.564
L22	24.978	52.404	3818.287	8.525	12.549	304.273	7641.599	26.207	3.138	4.564
	25.148	52.771	3899.043	8.585	12.634	308.607	7803.216	26.390	3.167	4.607
L23	25.102	74.858	5394.592	8.479	12.634	426.980	10796.283	37.436	2.639	2.673
	25.156	75.024	5430.725	8.497	12.661	428.922	10868.596	37.519	2.649	2.682
L24	25.156	75.024	5430.725	8.497	12.661	428.922	10868.596	37.519	2.649	2.682
	25.426	75.858	5613.809	8.592	12.796	438.700	11235.005	37.936	2.695	2.73
L25	25.461	59.119	4456.735	8.672	12.796	348.278	8919.334	29.565	3.091	4.054
	25.515	59.247	4485.919	8.691	12.824	349.820	8977.741	29.629	3.101	4.067
L26	25.517	58.306	4419.142	8.695	12.824	344.613	8844.099	29.158	3.123	4.164
	26.219	59.952	4804.183	8.941	13.175	364.648	9614.688	29.982	3.245	4.326
L27	26.175	81.987	6420.777	8.839	13.175	487.351	12850.003	41.001	2.739	2.64
	26.229	82.163	6462.028	8.857	13.202	489.477	12932.559	41.089	2.748	2.649
L28	26.229	82.163	6462.028	8.857	13.202	489.477	12932.559	41.089	2.748	2.649
	26.337	82.513	6545.057	8.895	13.256	493.745	13098.727	41.264	2.767	2.667
L29	26.310	95.757	7489.894	8.833	13.256	565.022	14989.644	47.888	2.459	2.028
	26.364	95.962	7538.043	8.852	13.283	567.497	15086.005	47.990	2.468	2.035
L30	26.412	72.122	5808.264	8.963	13.283	437.271	11624.171	36.068	3.018	3.353
	26.466	72.274	5845.061	8.982	13.310	439.148	11697.812	36.144	3.027	3.364
L31	26.466	72.274	5845.061	8.982	13.310	439.148	11697.812	36.144	3.027	3.364
	26.503	72.378	5870.171	8.995	13.328	440.426	11748.066	36.196	3.034	3.371
L32	26.528	59.690	4903.427	9.052	13.328	367.894	9813.306	29.851	3.320	4.501
	26.582	59.814	4934.183	9.071	13.355	369.452	9874.859	29.913	3.329	4.514
L33	26.584	58.829	4857.675	9.076	13.355	363.723	9721.741	29.420	3.351	4.622
	27.664	61.278	5489.831	9.453	13.896	395.067	10986.886	30.645	3.538	4.88
L34	27.668	59.220	5315.469	9.462	13.896	382.519	10637.933	29.616	3.582	5.118
	28.749	61.585	5977.825	9.840	14.437	414.077	11963.516	30.798	3.770	5.385
L35	28.749	61.585	5977.825	9.840	14.437	414.077	11963.516	30.798	3.770	5.385
	29.047	62.237	6169.856	9.944	14.586	423.007	12347.831	31.124	3.821	5.459
L36	29.080	43.672	4395.396	10.020	14.586	301.350	8796.576	21.840	4.195	8.606
	29.134	43.755	4420.300	10.039	14.613	302.497	8846.415	21.882	4.205	8.625
L37	29.089	68.852	6814.979	9.937	14.613	466.373	13638.926	34.432	3.699	4.772
	29.478	69.794	7098.630	10.073	14.807	479.400	14206.602	34.904	3.766	4.859
L38	29.478	69.794	7098.630	10.073	14.807	479.400	14206.602	34.904	3.766	4.859
	29.532	69.925	7138.638	10.091	14.834	481.223	14286.670	34.969	3.775	4.872
L39	29.536	67.729	6926.603	10.100	14.834	466.930	13862.319	33.871	3.819	5.093
	30.617	70.262	7733.188	10.478	15.375	502.975	15476.552	35.138	4.007	5.342
L40	30.617	70.262	7733.188	10.478	15.375	502.975	15476.552	35.138	4.007	5.342
	30.973	71.098	8012.489	10.603	15.553	515.164	16035.521	35.556	4.069	5.425
L41	30.960	79.160	8868.871	10.572	15.553	570.225	17749.413	39.587	3.915	4.674
	31.014	79.301	8916.491	10.591	15.580	572.292	17844.715	39.658	3.924	4.685
L42	31.016	78.150	8794.455	10.595	15.580	564.459	17600.482	39.083	3.946	4.783

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
	31.405	79.153	9137.458	10.731	15.775	579.240	18286.939	39.584	4.013	4.865
L43	31.411	75.649	8754.621	10.744	15.775	554.971	17520.761	37.832	4.079	5.18
	31.465	75.782	8800.871	10.763	15.802	556.949	17613.323	37.898	4.089	5.192
L44	31.466	74.610	8671.892	10.768	15.802	548.787	17355.195	37.312	4.111	5.304
	32.374	76.809	9461.357	11.085	16.256	582.022	18935.163	38.412	4.268	5.507

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 98.000-93.000				1	1	1			
L2 93.000-88.000				1	1	1			
L3 88.000-82.790				1	1	1			
L4 82.790-80.210				1	1	1			
L5 80.210-75.210				1	1	1			
L6 75.210-70.210				1	1	1			
L7 70.210-65.210				1	1	1			
L8 65.210-60.210				1	1	1			
L9 60.210-59.170				1	1	1			
L10 59.170-58.900				1	1	0.920928			
L11 58.900-58.750				1	1	0.920221			
L12 58.750-54.080				1	1	0.921203			
L13 54.080-53.830				1	1	0.962329			
L14 53.830-52.910				1	1	0.956574			
L15 52.910-52.660				1	1	0.954914			
L16 52.660-52.170				1	1	0.951723			
L17 52.170-51.920				1	1	0.967201			
L18 51.920-45.290				1	1	0.982646			
L19 45.290-44.290				1	1	0.960201			
L20 44.290-39.290				1	1	0.967035			
L21 39.290-34.290				1	1	0.976891			
L22 34.290-33.500				1	1	0.973259			
L23 33.500-33.250				1	1	0.925206			
L24 33.250-32.000				1	1	0.918515			
L25 32.000-31.750				1	1	0.949058			

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
L26 31.750-28.500				1	1	0.949341			
L27 28.500-28.250				1	1	0.912443			
L28 28.250-27.750				1	1	0.909847			
L29 27.750-27.500				1	1	0.858435			
L30 27.500-27.250				1	1	0.891457			
L31 27.250-27.080				1	1	0.89068			
L32 27.080-26.830				1	1	0.903088			
L33 26.830-21.830				1	1	0.898743			
L34 21.830-16.830				1	1	0.911405			
L35 16.830-15.450				1	1	0.90653			
L36 15.450-15.200				1	1	1.42779			
L37 15.200-13.400				1	1	0.965024			
L38 13.400-13.150				1	1	0.963972			
L39 13.150-8.150				1	1	0.974372			
L40 8.150-6.500				1	1	0.967815			
L41 6.500-6.250				1	1	0.944025			
L42 6.250-4.450				1	1	0.950588			
L43 4.450-4.200				1	1	0.914394			
L44 4.200-0.000				1	1	0.913716			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
d AVA7-50(1-5/8) (12E (1-5/8")+2R(1-3/8"))	B	No	Surface Ar (CaAa)	67.000 - 0.000	14	7	-0.100 0.300	2.010		0.001
d Safety Line 3/8 (E)	C	No	Surface Ar (CaAa)	98.000 - 0.000	1	1	0.100 0.100	0.375		0.000
d **@C** Sabre MS-600 (6" x 1"	A	No	Surface Af	30.500 -	1	1	-0.500	6.000	14.000	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
Plate) (E-Mod)			(CaAa)	0.000			-0.500			
Sabre MS-600 (6" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	30.500 - 0.000	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	8.500 - 0.500	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	17.450 - 2.450	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	30.500 - 11.410	1	1	-0.500 -0.500	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	A	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-600 (6" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	35.500 - 25.500	1	1	-0.300 -0.300	6.000	14.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	49.750 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	A	No	Surface Af (CaAa)	60.500 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	B	No	Surface Af (CaAa)	60.500 - 30.500	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod)	C	No	Surface Af (CaAa)	60.670 - 50.670	1	1	-0.500 -0.500	4.500	11.000	0.000
Sabre MS-450 (4.5" x 1" Plate) (E-Mod) *d*	C	No	Surface Af (CaAa)	54.417 - 45.917	1	1	-0.300 -0.300	4.500	11.000	0.000
CCI 6.5" x 1.25" Plate (P-Mod)	A	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.200 0.200	6.500	15.500	0.000
CCI 6.5" x 1.25" Plate (P-Mod) *d*	B	No	Surface Af (CaAa)	30.500 - 0.000	1	1	0.000 0.000	6.500	15.500	0.000
CCI 4.5" x 1" Plate (P-Mod)	A	No	Surface Af (CaAa)	55.500 - 30.500	1	1	0.200 0.200	4.500	11.000	0.000
CCI 4.5" x 1" Plate (P-Mod)	B	No	Surface Af (CaAa)	55.500 - 30.500	1	1	0.000 0.000	4.500	11.000	0.000
CCI 4.5" x 1" Plate (P-Mod) *d*	C	No	Surface Af (CaAa)	55.500 - 25.500	1	1	0.200 0.200	4.500	11.000	0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB114-08U3M12-XXXF(7/8) (R)	B	No	No	Inside Pole	94.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HB114-1-08U4-M5F(1-1/4) (R) *d*	B	No	No	Inside Pole	94.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
AVA5-50(7/8) (E)	C	No	No	Inside Pole	89.000 - 0.000	6	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
LDF5-50A(7/8) (E)	C	No	No	Inside Pole	89.000 - 0.000	5	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HCS 6X12 6AWG(1-3/8) (P) *d*	C	No	No	Inside Pole	89.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
LDF5-50A(7/8) (E)	A	No	No	Inside Pole	74.000 - 0.000	12	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
FB-L98B-002-75000 (3/8) (E-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
FB-L98B-002-75000 (3/8) (R-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (R-Inside Conduit)	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
2" Rigid Conduit (E)	A	No	No	Inside Pole	74.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
2" Rigid Conduit (R) *d*	A	No	No	Inside Pole	74.000 - 0.000	2	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
LDF5-50A(7/8) (E) *d* *d*	B	No	No	Inside Pole	52.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	98.000-93.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.005
		C	0.000	0.000	0.188	0.000	0.001
L2	93.000-88.000	A	0.000	0.000	0.000	0.000	0.000

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	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.006
L3	88.000-82.790	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.024
		C	0.000	0.000	0.195	0.000	0.028
L4	82.790-80.210	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.012
		C	0.000	0.000	0.097	0.000	0.014
L5	80.210-75.210	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.027
L6	75.210-70.210	A	0.000	0.000	0.000	0.000	0.056
		B	0.000	0.000	0.000	0.000	0.023
		C	0.000	0.000	0.188	0.000	0.027
L7	70.210-65.210	A	0.000	0.000	0.000	0.000	0.074
		B	0.000	0.000	2.519	0.000	0.040
		C	0.000	0.000	0.188	0.000	0.027
L8	65.210-60.210	A	0.000	0.000	0.218	0.000	0.074
		B	0.000	0.000	7.253	0.000	0.072
		C	0.000	0.000	0.532	0.000	0.027
L9	60.210-59.170	A	0.000	0.000	0.780	0.000	0.015
		B	0.000	0.000	2.243	0.000	0.015
		C	0.000	0.000	0.819	0.000	0.006
L10	59.170-58.900	A	0.000	0.000	0.203	0.000	0.004
		B	0.000	0.000	0.582	0.000	0.004
		C	0.000	0.000	0.213	0.000	0.001
L11	58.900-58.750	A	0.000	0.000	0.113	0.000	0.002
		B	0.000	0.000	0.324	0.000	0.002
		C	0.000	0.000	0.118	0.000	0.001
L12	58.750-54.080	A	0.000	0.000	4.567	0.000	0.069
		B	0.000	0.000	11.138	0.000	0.067
		C	0.000	0.000	4.983	0.000	0.025
L13	54.080-53.830	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L14	53.830-52.910	A	0.000	0.000	1.380	0.000	0.014
		B	0.000	0.000	2.674	0.000	0.013
		C	0.000	0.000	2.071	0.000	0.005
L15	52.910-52.660	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L16	52.660-52.170	A	0.000	0.000	0.735	0.000	0.007
		B	0.000	0.000	1.424	0.000	0.007
		C	0.000	0.000	1.103	0.000	0.003
L17	52.170-51.920	A	0.000	0.000	0.375	0.000	0.004
		B	0.000	0.000	0.727	0.000	0.004
		C	0.000	0.000	0.563	0.000	0.001
L18	51.920-45.290	A	0.000	0.000	9.945	0.000	0.098
		B	0.000	0.000	19.273	0.000	0.098
		C	0.000	0.000	13.790	0.000	0.036
L19	45.290-44.290	A	0.000	0.000	1.500	0.000	0.015
		B	0.000	0.000	2.907	0.000	0.015
		C	0.000	0.000	1.538	0.000	0.005
L20	44.290-39.290	A	0.000	0.000	7.500	0.000	0.074
		B	0.000	0.000	14.535	0.000	0.074
		C	0.000	0.000	7.688	0.000	0.027
L21	39.290-34.290	A	0.000	0.000	8.604	0.000	0.074
		B	0.000	0.000	15.639	0.000	0.074
		C	0.000	0.000	8.791	0.000	0.027
L22	34.290-33.500	A	0.000	0.000	1.906	0.000	0.012
		B	0.000	0.000	3.017	0.000	0.012

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
		C	0.000	0.000	1.935	0.000	0.004
L23	33.500-33.250	A	0.000	0.000	0.603	0.000	0.004
		B	0.000	0.000	0.955	0.000	0.004
		C	0.000	0.000	0.612	0.000	0.001
L24	33.250-32.000	A	0.000	0.000	3.015	0.000	0.018
		B	0.000	0.000	4.774	0.000	0.018
		C	0.000	0.000	3.062	0.000	0.007
L25	32.000-31.750	A	0.000	0.000	0.603	0.000	0.004
		B	0.000	0.000	0.955	0.000	0.004
		C	0.000	0.000	0.612	0.000	0.001
L26	31.750-28.500	A	0.000	0.000	9.006	0.000	0.048
		B	0.000	0.000	13.579	0.000	0.048
		C	0.000	0.000	8.461	0.000	0.017
L27	28.500-28.250	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L28	28.250-27.750	A	0.000	0.000	1.498	0.000	0.007
		B	0.000	0.000	2.201	0.000	0.007
		C	0.000	0.000	1.350	0.000	0.003
L29	27.750-27.500	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L30	27.500-27.250	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L31	27.250-27.080	A	0.000	0.000	0.509	0.000	0.003
		B	0.000	0.000	0.748	0.000	0.003
		C	0.000	0.000	0.459	0.000	0.001
L32	27.080-26.830	A	0.000	0.000	0.749	0.000	0.004
		B	0.000	0.000	1.101	0.000	0.004
		C	0.000	0.000	0.675	0.000	0.001
L33	26.830-21.830	A	0.000	0.000	11.630	0.000	0.074
		B	0.000	0.000	18.665	0.000	0.074
		C	0.000	0.000	7.398	0.000	0.027
L34	21.830-16.830	A	0.000	0.000	10.417	0.000	0.074
		B	0.000	0.000	17.452	0.000	0.074
		C	0.000	0.000	5.808	0.000	0.027
L35	16.830-15.450	A	0.000	0.000	2.875	0.000	0.020
		B	0.000	0.000	4.817	0.000	0.020
		C	0.000	0.000	2.812	0.000	0.007
L36	15.450-15.200	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.509	0.000	0.001
L37	15.200-13.400	A	0.000	0.000	3.750	0.000	0.027
		B	0.000	0.000	6.283	0.000	0.026
		C	0.000	0.000	3.668	0.000	0.010
L38	13.400-13.150	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.509	0.000	0.001
L39	13.150-8.150	A	0.000	0.000	10.417	0.000	0.074
		B	0.000	0.000	17.452	0.000	0.074
		C	0.000	0.000	7.224	0.000	0.027
L40	8.150-6.500	A	0.000	0.000	3.438	0.000	0.024
		B	0.000	0.000	5.759	0.000	0.024
		C	0.000	0.000	3.108	0.000	0.009
L41	6.500-6.250	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.471	0.000	0.001
L42	6.250-4.450	A	0.000	0.000	3.750	0.000	0.027
		B	0.000	0.000	6.283	0.000	0.026
		C	0.000	0.000	3.391	0.000	0.010

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
L43	4.450-4.200	A	0.000	0.000	0.521	0.000	0.004
		B	0.000	0.000	0.873	0.000	0.004
		C	0.000	0.000	0.471	0.000	0.001
L44	4.200-0.000	A	0.000	0.000	8.750	0.000	0.062
		B	0.000	0.000	14.659	0.000	0.062
		C	0.000	0.000	5.039	0.000	0.023

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	98.000-93.000	A	0.945	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.005
		C		0.000	0.000	1.133	0.000	0.009
L2	93.000-88.000	A	0.940	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	1.128	0.000	0.014
L3	88.000-82.790	A	0.935	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.024
		C		0.000	0.000	1.169	0.000	0.036
L4	82.790-80.210	A	0.930	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.012
		C		0.000	0.000	0.579	0.000	0.018
L5	80.210-75.210	A	0.926	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	1.113	0.000	0.034
L6	75.210-70.210	A	0.920	0.000	0.000	0.000	0.000	0.056
		B		0.000	0.000	0.000	0.000	0.023
		C		0.000	0.000	1.107	0.000	0.034
L7	70.210-65.210	A	0.913	0.000	0.000	0.000	0.000	0.074
		B		0.000	0.000	3.557	0.000	0.072
		C		0.000	0.000	1.101	0.000	0.034
L8	65.210-60.210	A	0.906	0.000	0.000	0.270	0.000	0.075
		B		0.000	0.000	10.197	0.000	0.161
		C		0.000	0.000	1.489	0.000	0.036
L9	60.210-59.170	A	0.902	0.000	0.000	0.968	0.000	0.021
		B		0.000	0.000	3.031	0.000	0.038
		C		0.000	0.000	1.119	0.000	0.012
L10	59.170-58.900	A	0.901	0.000	0.000	0.251	0.000	0.005
		B		0.000	0.000	0.787	0.000	0.010
		C		0.000	0.000	0.291	0.000	0.003
L11	58.900-58.750	A	0.901	0.000	0.000	0.140	0.000	0.003
		B		0.000	0.000	0.437	0.000	0.006
		C		0.000	0.000	0.161	0.000	0.002
L12	58.750-54.080	A	0.897	0.000	0.000	5.660	0.000	0.100
		B		0.000	0.000	14.920	0.000	0.179
		C		0.000	0.000	6.612	0.000	0.064
L13	54.080-53.830	A	0.893	0.000	0.000	0.464	0.000	0.006
		B		0.000	0.000	0.960	0.000	0.010
		C		0.000	0.000	0.703	0.000	0.005
L14	53.830-52.910	A	0.892	0.000	0.000	1.708	0.000	0.023
		B		0.000	0.000	3.531	0.000	0.038
		C		0.000	0.000	2.586	0.000	0.020
L15	52.910-52.660	A	0.891	0.000	0.000	0.464	0.000	0.006
		B		0.000	0.000	0.959	0.000	0.010
		C		0.000	0.000	0.703	0.000	0.005
L16	52.660-52.170	A	0.890	0.000	0.000	0.909	0.000	0.012

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	1.880	0.000	0.020
		C		0.000	0.000	1.377	0.000	0.011
L17	52.170-51.920	A	0.890	0.000	0.000	0.464	0.000	0.006
		B		0.000	0.000	0.959	0.000	0.010
		C		0.000	0.000	0.702	0.000	0.005
L18	51.920-45.290	A	0.883	0.000	0.000	12.288	0.000	0.163
		B		0.000	0.000	25.413	0.000	0.277
		C		0.000	0.000	17.621	0.000	0.135
L19	45.290-44.290	A	0.876	0.000	0.000	1.853	0.000	0.025
		B		0.000	0.000	3.833	0.000	0.042
		C		0.000	0.000	2.068	0.000	0.017
L20	44.290-39.290	A	0.870	0.000	0.000	9.241	0.000	0.122
		B		0.000	0.000	19.122	0.000	0.207
		C		0.000	0.000	10.298	0.000	0.082
L21	39.290-34.290	A	0.859	0.000	0.000	10.434	0.000	0.129
		B		0.000	0.000	20.302	0.000	0.212
		C		0.000	0.000	11.481	0.000	0.088
L22	34.290-33.500	A	0.852	0.000	0.000	2.247	0.000	0.024
		B		0.000	0.000	3.805	0.000	0.037
		C		0.000	0.000	2.412	0.000	0.017
L23	33.500-33.250	A	0.851	0.000	0.000	0.711	0.000	0.007
		B		0.000	0.000	1.204	0.000	0.012
		C		0.000	0.000	0.763	0.000	0.005
L24	33.250-32.000	A	0.849	0.000	0.000	3.554	0.000	0.037
		B		0.000	0.000	6.018	0.000	0.058
		C		0.000	0.000	3.813	0.000	0.027
L25	32.000-31.750	A	0.847	0.000	0.000	0.711	0.000	0.007
		B		0.000	0.000	1.203	0.000	0.012
		C		0.000	0.000	0.762	0.000	0.005
L26	31.750-28.500	A	0.842	0.000	0.000	10.396	0.000	0.102
		B		0.000	0.000	16.796	0.000	0.155
		C		0.000	0.000	10.398	0.000	0.072
L27	28.500-28.250	A	0.837	0.000	0.000	0.855	0.000	0.008
		B		0.000	0.000	1.347	0.000	0.012
		C		0.000	0.000	0.823	0.000	0.006
L28	28.250-27.750	A	0.836	0.000	0.000	1.710	0.000	0.016
		B		0.000	0.000	2.694	0.000	0.024
		C		0.000	0.000	1.646	0.000	0.011
L29	27.750-27.500	A	0.835	0.000	0.000	0.855	0.000	0.008
		B		0.000	0.000	1.347	0.000	0.012
		C		0.000	0.000	0.823	0.000	0.006
L30	27.500-27.250	A	0.834	0.000	0.000	0.855	0.000	0.008
		B		0.000	0.000	1.347	0.000	0.012
		C		0.000	0.000	0.823	0.000	0.006
L31	27.250-27.080	A	0.834	0.000	0.000	0.581	0.000	0.005
		B		0.000	0.000	0.916	0.000	0.008
		C		0.000	0.000	0.559	0.000	0.004
L32	27.080-26.830	A	0.833	0.000	0.000	0.855	0.000	0.008
		B		0.000	0.000	1.346	0.000	0.012
		C		0.000	0.000	0.822	0.000	0.006
L33	26.830-21.830	A	0.824	0.000	0.000	13.397	0.000	0.139
		B		0.000	0.000	23.221	0.000	0.219
		C		0.000	0.000	9.384	0.000	0.074
L34	21.830-16.830	A	0.806	0.000	0.000	12.028	0.000	0.130
		B		0.000	0.000	21.829	0.000	0.209
		C		0.000	0.000	7.516	0.000	0.063
L35	16.830-15.450	A	0.791	0.000	0.000	3.312	0.000	0.035
		B		0.000	0.000	6.012	0.000	0.057
		C		0.000	0.000	3.462	0.000	0.023
L36	15.450-15.200	A	0.787	0.000	0.000	0.600	0.000	0.006
		B		0.000	0.000	1.088	0.000	0.010

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	0.627	0.000	0.004
L37	15.200-13.400	A	0.782	0.000	0.000	4.313	0.000	0.046
		B		0.000	0.000	7.830	0.000	0.074
		C		0.000	0.000	4.505	0.000	0.030
L38	13.400-13.150	A	0.776	0.000	0.000	0.598	0.000	0.006
		B		0.000	0.000	1.087	0.000	0.010
		C		0.000	0.000	0.625	0.000	0.004
L39	13.150-8.150	A	0.759	0.000	0.000	11.935	0.000	0.126
		B		0.000	0.000	21.677	0.000	0.202
		C		0.000	0.000	9.019	0.000	0.067
L40	8.150-6.500	A	0.731	0.000	0.000	3.920	0.000	0.041
		B		0.000	0.000	7.124	0.000	0.065
		C		0.000	0.000	3.718	0.000	0.026
L41	6.500-6.250	A	0.721	0.000	0.000	0.593	0.000	0.006
		B		0.000	0.000	1.078	0.000	0.010
		C		0.000	0.000	0.562	0.000	0.004
L42	6.250-4.450	A	0.709	0.000	0.000	4.260	0.000	0.044
		B		0.000	0.000	7.745	0.000	0.070
		C		0.000	0.000	4.036	0.000	0.028
L43	4.450-4.200	A	0.694	0.000	0.000	0.590	0.000	0.006
		B		0.000	0.000	1.073	0.000	0.010
		C		0.000	0.000	0.559	0.000	0.004
L44	4.200-0.000	A	0.645	0.000	0.000	9.834	0.000	0.098
		B		0.000	0.000	17.898	0.000	0.155
		C		0.000	0.000	6.065	0.000	0.048

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	98.000-93.000	-0.062	0.292	-0.180	0.849
L2	93.000-88.000	-0.062	0.293	-0.183	0.861
L3	88.000-82.790	-0.062	0.293	-0.185	0.871
L4	82.790-80.210	-0.062	0.293	-0.186	0.876
L5	80.210-75.210	-0.062	0.293	-0.187	0.879
L6	75.210-70.210	-0.062	0.294	-0.188	0.885
L7	70.210-65.210	3.203	-0.850	2.300	-0.154
L8	65.210-60.210	4.456	-1.346	4.364	-1.022
L9	60.210-59.170	2.708	-0.821	2.710	-0.633
L10	59.170-58.900	2.719	-0.824	2.723	-0.636
L11	58.900-58.750	2.722	-0.825	2.726	-0.637
L12	58.750-54.080	2.459	-0.985	2.482	-0.813
L13	54.080-53.830	2.556	-0.840	2.529	-0.755
L14	53.830-52.910	2.566	-0.843	2.540	-0.758
L15	52.910-52.660	2.576	-0.847	2.551	-0.761
L16	52.660-52.170	2.582	-0.849	2.557	-0.763
L17	52.170-51.920	2.588	-0.851	2.564	-0.766
L18	51.920-45.290	2.437	-0.889	2.493	-0.812
L19	45.290-44.290	1.901	-1.433	2.059	-1.289
L20	44.290-39.290	1.933	-1.460	2.099	-1.318
L21	39.290-34.290	1.825	-1.383	2.012	-1.268
L22	34.290-33.500	1.485	-1.128	1.684	-1.064
L23	33.500-33.250	1.490	-1.132	1.690	-1.068
L24	33.250-32.000	1.495	-1.136	1.697	-1.073
L25	32.000-31.750	1.500	-1.141	1.704	-1.077
L26	31.750-28.500	1.538	-1.411	1.729	-1.308

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L27	28.500-28.250	1.566	-1.569	1.751	-1.446
L28	28.250-27.750	1.569	-1.572	1.755	-1.450
L29	27.750-27.500	1.572	-1.576	1.759	-1.453
L30	27.500-27.250	1.573	-1.578	1.761	-1.455
L31	27.250-27.080	1.575	-1.579	1.763	-1.457
L32	27.080-26.830	1.576	-1.581	1.765	-1.459
L33	26.830-21.830	2.585	-2.592	2.791	-2.405
L34	21.830-16.830	3.318	-3.045	3.520	-2.825
L35	16.830-15.450	4.301	-2.243	4.455	-2.088
L36	15.450-15.200	4.318	-2.252	4.474	-2.098
L37	15.200-13.400	4.342	-2.264	4.501	-2.111
L38	13.400-13.150	4.364	-2.276	4.526	-2.124
L39	13.150-8.150	3.521	-2.163	3.733	-2.007
L40	8.150-6.500	4.256	-2.302	4.390	-2.147
L41	6.500-6.250	4.275	-2.312	4.413	-2.159
L42	6.250-4.450	4.295	-2.324	4.438	-2.173
L43	4.450-4.200	4.315	-2.335	4.462	-2.188
L44	4.200-0.000	3.496	-2.929	3.709	-2.758

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	25	Safety Line 3/8	93.00 - 98.00	1.0000	1.0000
L2	25	Safety Line 3/8	88.00 - 93.00	1.0000	1.0000
L3	25	Safety Line 3/8	82.79 - 88.00	1.0000	1.0000
L5	25	Safety Line 3/8	75.21 - 80.21	1.0000	1.0000
L6	25	Safety Line 3/8	70.21 - 75.21	1.0000	1.0000
L7	20	AVA7-50(1-5/8)	65.21 - 67.00	1.0000	1.0000
L7	25	Safety Line 3/8	65.21 - 70.21	1.0000	1.0000
L8	20	AVA7-50(1-5/8)	60.21 - 65.21	1.0000	1.0000
L8	25	Safety Line 3/8	60.21 - 65.21	1.0000	1.0000
L8	39	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.50	1.0000	1.0000
L8	40	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.50	1.0000	1.0000
L8	41	Sabre MS-450 (4.5" x 1" Plate)	60.21 - 60.67	1.0000	1.0000
L9	20	AVA7-50(1-5/8)	59.17 - 60.21	1.0000	1.0000
L9	25	Safety Line 3/8	59.17 - 60.21	1.0000	1.0000
L9	39	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000
L9	40	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000
L9	41	Sabre MS-450 (4.5" x 1" Plate)	59.17 - 60.21	1.0000	1.0000
L10	20	AVA7-50(1-5/8)	58.90 - 59.17	1.0000	1.0000
L10	25	Safety Line 3/8	58.90 - 59.17	1.0000	1.0000
L10	39	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000
L10	40	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L10	41	Sabre MS-450 (4.5" x 1" Plate)	58.90 - 59.17	1.0000	1.0000
L11	20	AVA7-50(1-5/8)	58.75 - 58.90	1.0000	1.0000
L11	25	Safety Line 3/8	58.75 - 58.90	1.0000	1.0000
L11	39	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L11	40	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L11	41	Sabre MS-450 (4.5" x 1" Plate)	58.75 - 58.90	1.0000	1.0000
L12	20	AVA7-50(1-5/8)	54.08 - 58.75	1.0000	1.0000
L12	25	Safety Line 3/8	54.08 - 58.75	1.0000	1.0000
L12	39	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	40	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	41	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 58.75	1.0000	1.0000
L12	42	Sabre MS-450 (4.5" x 1" Plate)	54.08 - 54.42	1.0000	1.0000
L12	47	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L12	48	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L12	49	CCI 4.5" x 1" Plate	54.08 - 55.50	1.0000	1.0000
L13	20	AVA7-50(1-5/8)	53.83 - 54.08	1.0000	1.0000
L13	25	Safety Line 3/8	53.83 - 54.08	1.0000	1.0000
L13	39	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	40	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	41	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	42	Sabre MS-450 (4.5" x 1" Plate)	53.83 - 54.08	1.0000	1.0000
L13	47	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L13	48	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L13	49	CCI 4.5" x 1" Plate	53.83 - 54.08	1.0000	1.0000
L14	20	AVA7-50(1-5/8)	52.91 - 53.83	1.0000	1.0000
L14	25	Safety Line 3/8	52.91 - 53.83	1.0000	1.0000
L14	39	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	40	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	41	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	42	Sabre MS-450 (4.5" x 1" Plate)	52.91 - 53.83	1.0000	1.0000
L14	47	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L14	48	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L14	49	CCI 4.5" x 1" Plate	52.91 - 53.83	1.0000	1.0000
L15	20	AVA7-50(1-5/8)	52.66 - 52.91	1.0000	1.0000
L15	25	Safety Line 3/8	52.66 - 52.91	1.0000	1.0000
L15	39	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	40	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	41	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	42	Sabre MS-450 (4.5" x 1" Plate)	52.66 - 52.91	1.0000	1.0000
L15	47	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000
L15	48	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000
L15	49	CCI 4.5" x 1" Plate	52.66 - 52.91	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L16	20	AVA7-50(1-5/8)	52.17 - 52.66	1.0000	1.0000
L16	25	Safety Line 3/8	52.17 - 52.66	1.0000	1.0000
L16	39	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	40	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	41	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	42	Sabre MS-450 (4.5" x 1" Plate)	52.17 - 52.66	1.0000	1.0000
L16	47	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L16	48	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L16	49	CCI 4.5" x 1" Plate	52.17 - 52.66	1.0000	1.0000
L17	20	AVA7-50(1-5/8)	51.92 - 52.17	1.0000	1.0000
L17	25	Safety Line 3/8	51.92 - 52.17	1.0000	1.0000
L17	39	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	40	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	41	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	42	Sabre MS-450 (4.5" x 1" Plate)	51.92 - 52.17	1.0000	1.0000
L17	47	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L17	48	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L17	49	CCI 4.5" x 1" Plate	51.92 - 52.17	1.0000	1.0000
L18	20	AVA7-50(1-5/8)	45.29 - 51.92	1.0000	1.0000
L18	25	Safety Line 3/8	45.29 - 51.92	1.0000	1.0000
L18	38	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 49.75	1.0000	1.0000
L18	39	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 51.92	1.0000	1.0000
L18	40	Sabre MS-450 (4.5" x 1" Plate)	45.29 - 51.92	1.0000	1.0000
L18	41	Sabre MS-450 (4.5" x 1" Plate)	50.67 - 51.92	1.0000	1.0000
L18	42	Sabre MS-450 (4.5" x 1" Plate)	45.92 - 51.92	1.0000	1.0000
L18	47	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L18	48	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L18	49	CCI 4.5" x 1" Plate	45.29 - 51.92	1.0000	1.0000
L20	20	AVA7-50(1-5/8)	39.29 - 44.29	1.0000	1.0000
L20	25	Safety Line 3/8	39.29 - 44.29	1.0000	1.0000
L20	38	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	39	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	40	Sabre MS-450 (4.5" x 1" Plate)	39.29 - 44.29	1.0000	1.0000
L20	47	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000
L20	48	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000
L20	49	CCI 4.5" x 1" Plate	39.29 - 44.29	1.0000	1.0000
L21	20	AVA7-50(1-5/8)	34.29 - 39.29	1.0000	1.0000
L21	25	Safety Line 3/8	34.29 - 39.29	1.0000	1.0000
L21	34	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	35	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	36	Sabre MS-600 (6" x 1" Plate)	34.29 - 35.50	1.0000	1.0000
L21	38	Sabre MS-450 (4.5" x 1" Plate)	34.29 - 39.29	1.0000	1.0000
L21	39	Sabre MS-450 (4.5" x 1" Plate)	34.29 - 39.29	1.0000	1.0000
L21	40	Sabre MS-450 (4.5" x 1"	34.29 - 39.29	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
		Plate)			
L21	47	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L21	48	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L21	49	CCI 4.5" x 1" Plate	34.29 - 39.29	1.0000	1.0000
L22	20	AVA7-50(1-5/8)	33.50 - 34.29	1.0000	1.0000
L22	25	Safety Line 3/8	33.50 - 34.29	1.0000	1.0000
L22	34	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	35	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	36	Sabre MS-600 (6" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	38	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	39	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	40	Sabre MS-450 (4.5" x 1" Plate)	33.50 - 34.29	1.0000	1.0000
L22	47	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L22	48	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L22	49	CCI 4.5" x 1" Plate	33.50 - 34.29	1.0000	1.0000
L23	20	AVA7-50(1-5/8)	33.25 - 33.50	1.0000	1.0000
L23	25	Safety Line 3/8	33.25 - 33.50	1.0000	1.0000
L23	34	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	35	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	36	Sabre MS-600 (6" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	38	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	39	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	40	Sabre MS-450 (4.5" x 1" Plate)	33.25 - 33.50	1.0000	1.0000
L23	47	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L23	48	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L23	49	CCI 4.5" x 1" Plate	33.25 - 33.50	1.0000	1.0000
L24	20	AVA7-50(1-5/8)	32.00 - 33.25	1.0000	1.0000
L24	25	Safety Line 3/8	32.00 - 33.25	1.0000	1.0000
L24	34	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	35	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	36	Sabre MS-600 (6" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	38	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	39	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	40	Sabre MS-450 (4.5" x 1" Plate)	32.00 - 33.25	1.0000	1.0000
L24	47	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L24	48	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L24	49	CCI 4.5" x 1" Plate	32.00 - 33.25	1.0000	1.0000
L25	20	AVA7-50(1-5/8)	31.75 - 32.00	1.0000	1.0000
L25	25	Safety Line 3/8	31.75 - 32.00	1.0000	1.0000
L25	34	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	35	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	36	Sabre MS-600 (6" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	38	Sabre MS-450 (4.5" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	39	Sabre MS-450 (4.5" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	40	Sabre MS-450 (4.5" x 1" Plate)	31.75 - 32.00	1.0000	1.0000
L25	47	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L25	48	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L25	49	CCI 4.5" x 1" Plate	31.75 - 32.00	1.0000	1.0000
L26	20	AVA7-50(1-5/8)	28.50 - 31.75	1.0000	1.0000
L26	25	Safety Line 3/8	28.50 - 31.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L26	28	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	29	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	32	Sabre MS-600 (6" x 1" Plate)	28.50 - 30.50	1.0000	1.0000
L26	34	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	35	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	36	Sabre MS-600 (6" x 1" Plate)	28.50 - 31.75	1.0000	1.0000
L26	38	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	39	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	40	Sabre MS-450 (4.5" x 1" Plate)	30.50 - 31.75	1.0000	1.0000
L26	44	CCI 6.5" x 1.25" Plate	28.50 - 30.50	1.0000	1.0000
L26	45	CCI 6.5" x 1.25" Plate	28.50 - 30.50	1.0000	1.0000
L26	47	CCI 4.5" x 1" Plate	30.50 - 31.75	1.0000	1.0000
L26	48	CCI 4.5" x 1" Plate	30.50 - 31.75	1.0000	1.0000
L26	49	CCI 4.5" x 1" Plate	28.50 - 31.75	1.0000	1.0000
L27	20	AVA7-50(1-5/8)	28.25 - 28.50	1.0000	1.0000
L27	25	Safety Line 3/8	28.25 - 28.50	1.0000	1.0000
L27	28	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	29	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	32	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	34	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	35	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	36	Sabre MS-600 (6" x 1" Plate)	28.25 - 28.50	1.0000	1.0000
L27	44	CCI 6.5" x 1.25" Plate	28.25 - 28.50	1.0000	1.0000
L27	45	CCI 6.5" x 1.25" Plate	28.25 - 28.50	1.0000	1.0000
L27	49	CCI 4.5" x 1" Plate	28.25 - 28.50	1.0000	1.0000
L28	20	AVA7-50(1-5/8)	27.75 - 28.25	1.0000	1.0000
L28	25	Safety Line 3/8	27.75 - 28.25	1.0000	1.0000
L28	28	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	29	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	32	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	34	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	35	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	36	Sabre MS-600 (6" x 1" Plate)	27.75 - 28.25	1.0000	1.0000
L28	44	CCI 6.5" x 1.25" Plate	27.75 - 28.25	1.0000	1.0000
L28	45	CCI 6.5" x 1.25" Plate	27.75 - 28.25	1.0000	1.0000
L28	49	CCI 4.5" x 1" Plate	27.75 - 28.25	1.0000	1.0000
L29	20	AVA7-50(1-5/8)	27.50 - 27.75	1.0000	1.0000
L29	25	Safety Line 3/8	27.50 - 27.75	1.0000	1.0000
L29	28	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	29	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	32	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	34	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	35	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	36	Sabre MS-600 (6" x 1" Plate)	27.50 - 27.75	1.0000	1.0000
L29	44	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L29	45	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L29	49	CCI 4.5" x 1" Plate	27.50 - 27.75	1.0000	1.0000
L30	20	AVA7-50(1-5/8)	27.25 - 27.50	1.0000	1.0000
L30	25	Safety Line 3/8	27.25 - 27.50	1.0000	1.0000
L30	28	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	29	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	32	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	34	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	35	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	36	Sabre MS-600 (6" x 1" Plate)	27.25 - 27.50	1.0000	1.0000
L30	44	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L30	45	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L30	49	CCI 4.5" x 1" Plate	27.25 - 27.50	1.0000	1.0000
L31	20	AVA7-50(1-5/8)	27.08 - 27.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L31	25	Safety Line 3/8	27.08 - 27.25	1.0000	1.0000
L31	28	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	29	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	32	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	34	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	35	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	36	Sabre MS-600 (6" x 1" Plate)	27.08 - 27.25	1.0000	1.0000
L31	44	CCI 6.5" x 1.25" Plate	27.08 - 27.25	1.0000	1.0000
L31	45	CCI 6.5" x 1.25" Plate	27.08 - 27.25	1.0000	1.0000
L31	49	CCI 4.5" x 1" Plate	27.08 - 27.25	1.0000	1.0000
L32	20	AVA7-50(1-5/8)	26.83 - 27.08	1.0000	1.0000
L32	25	Safety Line 3/8	26.83 - 27.08	1.0000	1.0000
L32	28	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	29	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	32	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	34	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	35	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	36	Sabre MS-600 (6" x 1" Plate)	26.83 - 27.08	1.0000	1.0000
L32	44	CCI 6.5" x 1.25" Plate	26.83 - 27.08	1.0000	1.0000
L32	45	CCI 6.5" x 1.25" Plate	26.83 - 27.08	1.0000	1.0000
L32	49	CCI 4.5" x 1" Plate	26.83 - 27.08	1.0000	1.0000
L33	20	AVA7-50(1-5/8)	21.83 - 26.83	1.0000	1.0000
L33	25	Safety Line 3/8	21.83 - 26.83	1.0000	1.0000
L33	28	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	29	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	32	Sabre MS-600 (6" x 1" Plate)	21.83 - 26.83	1.0000	1.0000
L33	34	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	35	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	36	Sabre MS-600 (6" x 1" Plate)	25.50 - 26.83	1.0000	1.0000
L33	44	CCI 6.5" x 1.25" Plate	21.83 - 26.83	1.0000	1.0000
L33	45	CCI 6.5" x 1.25" Plate	21.83 - 26.83	1.0000	1.0000
L33	49	CCI 4.5" x 1" Plate	25.50 - 26.83	1.0000	1.0000
L34	20	AVA7-50(1-5/8)	16.83 - 21.83	1.0000	1.0000
L34	25	Safety Line 3/8	16.83 - 21.83	1.0000	1.0000
L34	28	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	29	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	31	Sabre MS-600 (6" x 1" Plate)	16.83 - 17.45	1.0000	1.0000
L34	32	Sabre MS-600 (6" x 1" Plate)	16.83 - 21.83	1.0000	1.0000
L34	44	CCI 6.5" x 1.25" Plate	16.83 - 21.83	1.0000	1.0000
L34	45	CCI 6.5" x 1.25" Plate	16.83 - 21.83	1.0000	1.0000
L35	20	AVA7-50(1-5/8)	15.45 - 16.83	1.0000	1.0000
L35	25	Safety Line 3/8	15.45 - 16.83	1.0000	1.0000
L35	28	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	29	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	31	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	32	Sabre MS-600 (6" x 1" Plate)	15.45 - 16.83	1.0000	1.0000
L35	44	CCI 6.5" x 1.25" Plate	15.45 - 16.83	1.0000	1.0000
L35	45	CCI 6.5" x 1.25" Plate	15.45 - 16.83	1.0000	1.0000
L36	20	AVA7-50(1-5/8)	15.20 - 15.45	1.0000	1.0000
L36	25	Safety Line 3/8	15.20 - 15.45	1.0000	1.0000
L36	28	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	29	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	31	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	32	Sabre MS-600 (6" x 1" Plate)	15.20 - 15.45	1.0000	1.0000
L36	44	CCI 6.5" x 1.25" Plate	15.20 - 15.45	1.0000	1.0000
L36	45	CCI 6.5" x 1.25" Plate	15.20 - 15.45	1.0000	1.0000
L37	20	AVA7-50(1-5/8)	13.40 - 15.20	1.0000	1.0000
L37	25	Safety Line 3/8	13.40 - 15.20	1.0000	1.0000
L37	28	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	29	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	31	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000
L37	32	Sabre MS-600 (6" x 1" Plate)	13.40 - 15.20	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L37	44	CCI 6.5" x 1.25" Plate	13.40 - 15.20	1.0000	1.0000
L37	45	CCI 6.5" x 1.25" Plate	13.40 - 15.20	1.0000	1.0000
L38	20	AVA7-50(1-5/8)	13.15 - 13.40	1.0000	1.0000
L38	25	Safety Line 3/8	13.15 - 13.40	1.0000	1.0000
L38	28	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	29	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	31	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	32	Sabre MS-600 (6" x 1" Plate)	13.15 - 13.40	1.0000	1.0000
L38	44	CCI 6.5" x 1.25" Plate	13.15 - 13.40	1.0000	1.0000
L38	45	CCI 6.5" x 1.25" Plate	13.15 - 13.40	1.0000	1.0000
L39	20	AVA7-50(1-5/8)	8.15 - 13.15	1.0000	1.0000
L39	25	Safety Line 3/8	8.15 - 13.15	1.0000	1.0000
L39	28	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	29	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	30	Sabre MS-600 (6" x 1" Plate)	8.15 - 8.50	1.0000	1.0000
L39	31	Sabre MS-600 (6" x 1" Plate)	8.15 - 13.15	1.0000	1.0000
L39	32	Sabre MS-600 (6" x 1" Plate)	11.41 - 13.15	1.0000	1.0000
L39	44	CCI 6.5" x 1.25" Plate	8.15 - 13.15	1.0000	1.0000
L39	45	CCI 6.5" x 1.25" Plate	8.15 - 13.15	1.0000	1.0000
L40	20	AVA7-50(1-5/8)	6.50 - 8.15	1.0000	1.0000
L40	25	Safety Line 3/8	6.50 - 8.15	1.0000	1.0000
L40	28	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	29	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	30	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	31	Sabre MS-600 (6" x 1" Plate)	6.50 - 8.15	1.0000	1.0000
L40	44	CCI 6.5" x 1.25" Plate	6.50 - 8.15	1.0000	1.0000
L40	45	CCI 6.5" x 1.25" Plate	6.50 - 8.15	1.0000	1.0000
L41	20	AVA7-50(1-5/8)	6.25 - 6.50	1.0000	1.0000
L41	25	Safety Line 3/8	6.25 - 6.50	1.0000	1.0000
L41	28	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	29	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	30	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	31	Sabre MS-600 (6" x 1" Plate)	6.25 - 6.50	1.0000	1.0000
L41	44	CCI 6.5" x 1.25" Plate	6.25 - 6.50	1.0000	1.0000
L41	45	CCI 6.5" x 1.25" Plate	6.25 - 6.50	1.0000	1.0000
L42	20	AVA7-50(1-5/8)	4.45 - 6.25	1.0000	1.0000
L42	25	Safety Line 3/8	4.45 - 6.25	1.0000	1.0000
L42	28	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	29	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	30	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	31	Sabre MS-600 (6" x 1" Plate)	4.45 - 6.25	1.0000	1.0000
L42	44	CCI 6.5" x 1.25" Plate	4.45 - 6.25	1.0000	1.0000
L42	45	CCI 6.5" x 1.25" Plate	4.45 - 6.25	1.0000	1.0000
L43	20	AVA7-50(1-5/8)	4.20 - 4.45	1.0000	1.0000
L43	25	Safety Line 3/8	4.20 - 4.45	1.0000	1.0000
L43	28	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	29	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	30	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	31	Sabre MS-600 (6" x 1" Plate)	4.20 - 4.45	1.0000	1.0000
L43	44	CCI 6.5" x 1.25" Plate	4.20 - 4.45	1.0000	1.0000
L43	45	CCI 6.5" x 1.25" Plate	4.20 - 4.45	1.0000	1.0000
L44	20	AVA7-50(1-5/8)	0.00 - 4.20	1.0000	1.0000
L44	25	Safety Line 3/8	0.00 - 4.20	1.0000	1.0000
L44	28	Sabre MS-600 (6" x 1" Plate)	0.00 - 4.20	1.0000	1.0000
L44	29	Sabre MS-600 (6" x 1" Plate)	0.00 - 4.20	1.0000	1.0000
L44	30	Sabre MS-600 (6" x 1" Plate)	0.50 - 4.20	1.0000	1.0000
L44	31	Sabre MS-600 (6" x 1" Plate)	2.45 - 4.20	1.0000	1.0000
L44	44	CCI 6.5" x 1.25" Plate	0.00 - 4.20	1.0000	1.0000
L44	45	CCI 6.5" x 1.25" Plate	0.00 - 4.20	1.0000	1.0000

Discrete Tower Loads

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
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(R)			3.000			1" Ice	7.473	6.472	0.193
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(R)			3.000			1" Ice	7.473	6.472	0.193
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	6.580 7.031	4.959 5.754	0.077 0.132
(R)			3.000			1" Ice	7.473	6.472	0.193
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	12.509 13.108	7.412 8.598	0.103 0.194
(R)			3.000			1" Ice	13.672	9.496	0.293
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	12.509 13.108	7.412 8.598	0.103 0.194
(R)			3.000			1" Ice	13.672	9.496	0.293
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	12.509 13.108	7.412 8.598	0.103 0.194
(R)			3.000			1" Ice	13.672	9.496	0.293
(2) RRH2X50-800	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(R)			3.000			1" Ice	2.035	1.580	0.090
(2) RRH2X50-800	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(R)			3.000			1" Ice	2.035	1.580	0.090
(2) RRH2X50-800	C	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	1.701 1.864	1.282 1.428	0.053 0.070
(R)			3.000			1" Ice	2.035	1.580	0.090
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(R)			3.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(R)			3.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.322 2.527	2.238 2.441	0.060 0.083
(R)			3.000			1" Ice	2.739	2.651	0.110
TD-RRH8x20-25	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(R)			3.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(R)			3.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	C	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	4.045 4.298	1.535 1.714	0.070 0.097
(R)			3.000			1" Ice	4.557	1.901	0.128
9' x 2" Pipe Mount (E-per Photo)	A	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.138 3.066	2.138 3.066	0.065 0.081
			0.000			1" Ice	4.010	4.010	0.103
9' x 2" Pipe Mount (E-per Photo)	B	From Leg	4.000 0.000	0.000	94.000	No Ice 1/2" Ice	2.138 3.066	2.138 3.066	0.065 0.081

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	4.010	4.010	0.103
9' x 2" Pipe Mount (E-per Photo)	C	From Leg	4.000 0.000 0.000	0.000	94.000	No Ice 1/2" Ice 1" Ice	2.138 3.066 4.010	2.138 3.066 4.010	0.065 0.081 0.103
4'x2" Horizontal Mount Pipe (R-Handrail Support)	A	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.060 0.068 0.078
4'x2" Horizontal Mount Pipe (R-Handrail Support)	B	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.060 0.068 0.078
4'x2" Horizontal Mount Pipe (R-Handrail Support)	C	From Leg	2.000 0.000 4.000	0.000	94.000	No Ice 1/2" Ice 1" Ice	0.866 1.111 1.365	0.866 1.111 1.365	0.060 0.068 0.078
Miscellaneous [NA 510-1] (R-Handrail Kit)	C	None		0.000	98.000	No Ice 1/2" Ice 1" Ice	6.000 8.500 11.000	6.000 8.500 11.000	0.256 0.340 0.423
Platform Mount [LP 714-1] (E-Area changed to 14' Mount) *d*	C	None		0.000	94.000	No Ice 1/2" Ice 1" Ice	34.972 41.281 47.590	34.972 41.281 47.590	1.493 1.904 2.315
APXV18-209014-C w/ Mount Pipe (E)	A	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	3.722 4.134 4.541	3.311 4.017 4.684	0.038 0.072 0.112
APXV18-209014-C w/ Mount Pipe (E)	B	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	3.722 4.134 4.541	3.311 4.017 4.684	0.038 0.072 0.112
APXV18-209014-C w/ Mount Pipe (E)	C	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	3.722 4.134 4.541	3.311 4.017 4.684	0.038 0.072 0.112
ATMPP1412D-1CWA (E)	A	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.000 1.129 1.265	0.382 0.477 0.578	0.013 0.020 0.028
ATMPP1412D-1CWA (E)	B	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.000 1.129 1.265	0.382 0.477 0.578	0.013 0.020 0.028
ATMPP1412D-1CWA (E)	C	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.000 1.129 1.265	0.382 0.477 0.578	0.013 0.020 0.028
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	20.480 21.231 21.990	11.024 12.550 14.099	0.161 0.297 0.444
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	20.480 21.231 21.990	11.024 12.550 14.099	0.161 0.297 0.444
APXVAARR24_43-U-NA20 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	20.480 21.231 21.990	11.024 12.550 14.099	0.161 0.297 0.444
RADIO 4449 B12/B71 (P)	A	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.300 1.445 1.597	0.075 0.092 0.112
RADIO 4449 B12/B71 (P)	B	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.300 1.445 1.597	0.075 0.092 0.112
RADIO 4449 B12/B71 (P)	C	From Leg	4.000 0.000 1.000	0.000	89.000	No Ice 1/2" Ice 1" Ice	1.650 1.810 1.978	1.300 1.445 1.597	0.075 0.092 0.112
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	89.000	No Ice	1.425	1.425	0.022

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
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	89.000	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
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	89.000	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
Platform Mount [LP 305-1]	C	None		0.000	89.000	No Ice	18.010	18.010	1.121
(E)						1/2" Ice	23.330	23.330	1.352
						1" Ice	28.650	28.650	1.584
d									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	74.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	74.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	74.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			3.000			1" Ice	6.607	5.711	0.157
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.000	0.000	74.000	No Ice	11.704	8.938	0.092
			0.000			1/2" Ice	12.424	10.450	0.178
(E)			3.000			1" Ice	13.153	11.986	0.273
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.000	0.000	74.000	No Ice	11.704	8.938	0.092
			0.000			1/2" Ice	12.424	10.450	0.178
(E)			3.000			1" Ice	13.153	11.986	0.273
TT19-08BP111-001	A	From Leg	4.000	0.000	74.000	No Ice	0.545	0.442	0.016
(E)			0.000			1/2" Ice	0.641	0.530	0.022
			3.000			1" Ice	0.743	0.626	0.029
TT19-08BP111-001	B	From Leg	4.000	0.000	74.000	No Ice	0.545	0.442	0.016
(E)			0.000			1/2" Ice	0.641	0.530	0.022
			3.000			1" Ice	0.743	0.626	0.029
TT19-08BP111-001	C	From Leg	4.000	0.000	74.000	No Ice	0.545	0.442	0.016
(E)			0.000			1/2" Ice	0.641	0.530	0.022
			3.000			1" Ice	0.743	0.626	0.029
DC6-48-60-18-8F	B	From Leg	2.000	0.000	74.000	No Ice	1.212	1.212	0.033
(E)			0.000			1/2" Ice	1.892	1.892	0.055
			3.000			1" Ice	2.105	2.105	0.080
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.000	0.000	74.000	No Ice	13.535	10.960	0.114
			0.000			1/2" Ice	14.238	12.486	0.218
(R)			3.000			1" Ice	14.949	14.037	0.331
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.000	0.000	74.000	No Ice	13.535	10.960	0.114
			0.000			1/2" Ice	14.238	12.486	0.218
(R)			3.000			1" Ice	14.949	14.037	0.331
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.000	0.000	74.000	No Ice	13.535	10.960	0.114
			0.000			1/2" Ice	14.238	12.486	0.218
(R)			3.000			1" Ice	14.949	14.037	0.331
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.000	0.000	74.000	No Ice	11.683	9.842	0.099
			0.000			1/2" Ice	12.404	11.366	0.189
(R)			3.000			1" Ice	13.135	12.914	0.288
RRUS 11 B12	A	From Leg	4.000	0.000	74.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 11 B12	B	From Leg	4.000	0.000	74.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095

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
RRUS 11 B12	C	From Leg	4.000	0.000	74.000	No Ice	2.833	1.182	0.051
(R)			0.000			1/2" Ice	3.043	1.330	0.072
			3.000			1" Ice	3.259	1.485	0.095
RRUS 32 B30	A	From Leg	4.000	0.000	74.000	No Ice	2.692	1.573	0.060
(R)			0.000			1/2" Ice	2.912	1.756	0.080
			3.000			1" Ice	3.138	1.945	0.104
RRUS 32 B30	B	From Leg	4.000	0.000	74.000	No Ice	2.692	1.573	0.060
(R)			0.000			1/2" Ice	2.912	1.756	0.080
			3.000			1" Ice	3.138	1.945	0.104
RRUS 32 B30	C	From Leg	4.000	0.000	74.000	No Ice	2.692	1.573	0.060
(R)			0.000			1/2" Ice	2.912	1.756	0.080
			3.000			1" Ice	3.138	1.945	0.104
RRUS 32 B2	A	From Leg	4.000	0.000	74.000	No Ice	2.731	1.668	0.053
(R)			0.000			1/2" Ice	2.953	1.855	0.074
			3.000			1" Ice	3.182	2.049	0.098
RRUS 32 B2	B	From Leg	4.000	0.000	74.000	No Ice	2.731	1.668	0.053
(R)			0.000			1/2" Ice	2.953	1.855	0.074
			3.000			1" Ice	3.182	2.049	0.098
RRUS 32 B2	C	From Leg	4.000	0.000	74.000	No Ice	2.731	1.668	0.053
(R)			0.000			1/2" Ice	2.953	1.855	0.074
			3.000			1" Ice	3.182	2.049	0.098
DBC0061F1V51-2	A	From Leg	4.000	0.000	74.000	No Ice	0.433	0.413	0.025
(R)			0.000			1/2" Ice	0.518	0.496	0.031
			3.000			1" Ice	0.609	0.586	0.038
DBC0061F1V51-2	B	From Leg	4.000	0.000	74.000	No Ice	0.433	0.413	0.025
(R)			0.000			1/2" Ice	0.518	0.496	0.031
			3.000			1" Ice	0.609	0.586	0.038
DBC0061F1V51-2	C	From Leg	4.000	0.000	74.000	No Ice	0.433	0.413	0.025
(R)			0.000			1/2" Ice	0.518	0.496	0.031
			3.000			1" Ice	0.609	0.586	0.038
DC6-48-60-18-8F	A	From Leg	4.000	0.000	74.000	No Ice	1.212	1.212	0.033
(R)			0.000			1/2" Ice	1.892	1.892	0.055
			3.000			1" Ice	2.105	2.105	0.080
3' x 2" Pipe Mount	B	From Leg	1.000	0.000	74.000	No Ice	0.583	0.583	0.011
(E-For DC6 Per Photo)			0.000			1/2" Ice	0.770	0.770	0.017
			0.000			1" Ice	0.967	0.967	0.024
Platform Mount [LP 303-1]	C	None		0.000	74.000	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
d									
(2) LPA-80063/6CFX2 w/	A	From Leg	4.000	0.000	67.000	No Ice	9.831	10.215	0.052
Mount Pipe			0.000			1/2" Ice	10.400	11.384	0.145
(E)			0.000			1" Ice	10.933	12.269	0.246
(2) LPA-80063/6CFX2 w/	B	From Leg	4.000	0.000	67.000	No Ice	9.831	10.215	0.052
Mount Pipe			0.000			1/2" Ice	10.400	11.384	0.145
(E)			0.000			1" Ice	10.933	12.269	0.246
(2) LPA-80063/6CFX2 w/	C	From Leg	4.000	0.000	67.000	No Ice	9.831	10.215	0.052
Mount Pipe			0.000			1/2" Ice	10.400	11.384	0.145
(E)			0.000			1" Ice	10.933	12.269	0.246
(2) SBNHH-1D65B w/	A	From Leg	4.000	0.000	67.000	No Ice	8.397	7.071	0.066
Mount Pipe			0.000			1/2" Ice	8.960	8.260	0.135
(R)			0.000			1" Ice	9.490	9.170	0.212
(2) SBNHH-1D65B w/	B	From Leg	4.000	0.000	67.000	No Ice	8.397	7.071	0.066
Mount Pipe			0.000			1/2" Ice	8.960	8.260	0.135
(R)			0.000			1" Ice	9.490	9.170	0.212
(2) SBNHH-1D65B w/	C	From Leg	4.000	0.000	67.000	No Ice	8.397	7.071	0.066
Mount Pipe			0.000			1/2" Ice	8.960	8.260	0.135

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
(R)			0.000			1" Ice	9.490	9.170	0.212
B13 RRH 4X30	A	From Leg	4.000	0.000	67.000	No Ice	2.055	1.320	0.056
(R)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
B13 RRH 4X30	B	From Leg	4.000	0.000	67.000	No Ice	2.055	1.320	0.056
(R)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
B13 RRH 4X30	C	From Leg	4.000	0.000	67.000	No Ice	2.055	1.320	0.056
(R)			0.000			1/2" Ice	2.241	1.475	0.073
			0.000			1" Ice	2.433	1.638	0.093
B66A RRH4X45	A	From Leg	4.000	0.000	67.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			0.000			1" Ice	2.970	1.978	0.100
B66A RRH4X45	B	From Leg	4.000	0.000	67.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			0.000			1" Ice	2.970	1.978	0.100
B66A RRH4X45	C	From Leg	4.000	0.000	67.000	No Ice	2.537	1.610	0.057
(R)			0.000			1/2" Ice	2.750	1.791	0.077
			0.000			1" Ice	2.970	1.978	0.100
RC2DC-3315-PF-48	A	From Leg	4.000	0.000	67.000	No Ice	3.792	2.512	0.032
(R)			0.000			1/2" Ice	4.044	2.725	0.063
			0.000			1" Ice	4.303	2.945	0.099
RC2DC-3315-PF-48	B	From Leg	4.000	0.000	67.000	No Ice	3.792	2.512	0.032
(R)			0.000			1/2" Ice	4.044	2.725	0.063
			0.000			1" Ice	4.303	2.945	0.099
Platform Mount [LP 303-1]	C	None		0.000	67.000	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
Miscellaneous [NA 509-3]	C	None		0.000	67.000	No Ice	11.840	11.840	0.275
(E-Photo)						1/2" Ice	16.960	16.960	0.296
						1" Ice	22.080	22.080	0.317
d									
KS24019-L112A	C	From Leg	3.000	0.000	52.000	No Ice	0.141	0.141	0.005
(E)			0.000			1/2" Ice	0.198	0.198	0.007
			2.000			1" Ice	0.262	0.262	0.009
Side Arm Mount [SO 701-1]	C	From Leg	1.500	0.000	52.000	No Ice	0.850	1.670	0.065
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
d									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice

Comb. No.	Description
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	98 - 93	Pole	Max Tension	39	0.000	0.000	-0.000
			Max. Compression	26	-6.757	-0.002	-0.004
			Max. Mx	8	-3.446	-16.497	0.000
			Max. My	14	-3.442	-0.002	-16.501
			Max. Vy	8	5.822	-16.497	0.000
			Max. Vx	2	-5.824	-0.002	16.500
			Max. Torque	22			0.001
L2	93 - 88	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-11.162	-0.009	-0.005
			Max. Mx	8	-5.647	-51.968	0.001

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-5.639	-0.008	51.986
			Max. Vy	8	9.585	-51.968	0.001
			Max. Vx	2	-9.589	-0.008	51.986
			Max. Torque	22			0.001
L3	88 - 82.79	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-11.347	-0.014	-0.005
			Max. Mx	8	-5.796	-78.843	0.003
			Max. My	2	-5.788	-0.012	78.874
			Max. Vy	8	9.690	-78.843	0.003
			Max. Vx	2	-9.695	-0.012	78.874
			Max. Torque	22			0.001
L4	82.79 - 80.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-11.875	-0.025	-0.005
			Max. Mx	8	-6.215	-127.826	0.005
			Max. My	2	-6.207	-0.019	127.879
			Max. Vy	8	9.904	-127.826	0.005
			Max. Vx	2	-9.909	-0.019	127.879
			Max. Torque	24			0.002
L5	80.21 - 75.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-12.294	-0.036	-0.004
			Max. Mx	8	-6.600	-177.776	0.007
			Max. My	2	-6.592	-0.027	177.853
			Max. Vy	8	10.090	-177.776	0.007
			Max. Vx	2	-10.095	-0.027	177.853
			Max. Torque	24			0.002
L6	75.21 - 70.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-18.433	-0.345	0.215
			Max. Mx	8	-9.908	-257.688	0.201
			Max. My	2	-9.894	-0.251	257.864
			Max. Vy	8	14.962	-257.688	0.201
			Max. Vx	2	-14.985	-0.251	257.864
			Max. Torque	15			0.254
L7	70.21 - 65.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-24.853	-0.812	0.478
			Max. Mx	8	-13.219	-342.923	0.323
			Max. My	2	-13.199	-0.440	343.186
			Max. Vy	8	20.663	-342.923	0.323
			Max. Vx	2	-20.710	-0.440	343.186
			Max. Torque	13			0.646
L8	65.21 - 60.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.579	-0.951	0.550
			Max. Mx	8	-14.007	-446.427	0.329
			Max. My	2	-13.968	-0.465	447.557
			Max. Vy	8	20.755	-446.427	0.329
			Max. Vx	2	-21.065	-0.465	447.557
			Max. Torque	13			0.733
L9	60.21 - 59.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.747	-0.980	0.566
			Max. Mx	8	-14.172	-468.027	0.330
			Max. My	2	-14.133	-0.471	469.489
			Max. Vy	8	20.806	-468.027	0.330
			Max. Vx	2	-21.144	-0.471	469.489
			Max. Torque	13			0.742
L10	59.17 - 58.9	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.806	-0.988	0.570
			Max. Mx	8	-14.251	-473.644	0.330
			Max. My	2	-14.212	-0.473	475.196
			Max. Vy	8	20.807	-473.644	0.330
			Max. Vx	2	-21.146	-0.473	475.196
			Max. Torque	13			0.744
L11	58.9 - 58.75	Pole	Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-25.839	-0.992	0.572
			Max. Mx	8	-14.281	-476.767	0.330
			Max. My	2	-14.242	-0.474	478.369
			Max. Vy	8	20.817	-476.767	0.330
			Max. Vx	2	-21.157	-0.474	478.369
			Max. Torque	13			0.746
L12	58.75 - 54.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.882	-1.123	0.642
			Max. Mx	8	-15.145	-574.830	0.336
			Max. My	2	-15.108	-0.504	578.047
			Max. Vy	8	21.177	-574.830	0.336
			Max. Vx	2	-21.538	-0.504	578.047
			Max. Torque	13			0.787
L13	54.08 - 53.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-26.956	-1.131	0.645
			Max. Mx	8	-15.222	-580.126	0.336
			Max. My	2	-15.185	-0.506	583.433
			Max. Vy	8	21.188	-580.126	0.336
			Max. Vx	2	-21.551	-0.506	583.433
			Max. Torque	13			0.789
L14	53.83 - 52.91	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.229	-1.157	0.655
			Max. Mx	8	-15.432	-599.666	0.337
			Max. My	2	-15.395	-0.512	603.304
			Max. Vy	8	21.279	-599.666	0.337
			Max. Vx	2	-21.646	-0.512	603.304
			Max. Torque	13			0.798
L15	52.91 - 52.66	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.308	-1.164	0.657
			Max. Mx	8	-15.505	-604.989	0.338
			Max. My	2	-15.468	-0.514	608.718
			Max. Vy	8	21.296	-604.989	0.338
			Max. Vx	2	-21.666	-0.514	608.718
			Max. Torque	13			0.800
L16	52.66 - 52.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.463	-1.178	0.663
			Max. Mx	8	-15.627	-615.440	0.338
			Max. My	2	-15.591	-0.517	619.347
			Max. Vy	8	21.344	-615.440	0.338
			Max. Vx	2	-21.716	-0.517	619.347
			Max. Torque	13			0.804
L17	52.17 - 51.92	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.650	-0.940	0.524
			Max. Mx	8	-15.771	-620.614	0.238
			Max. My	2	-15.734	-0.345	624.692
			Max. Vy	8	21.419	-620.614	0.238
			Max. Vx	2	-21.808	-0.345	624.692
			Max. Torque	13			0.804
L18	51.92 - 45.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-28.603	-1.030	0.563
			Max. Mx	8	-16.537	-689.852	0.197
			Max. My	2	-16.500	-0.322	695.186
			Max. Vy	8	21.713	-689.852	0.197
			Max. Vx	2	-22.116	-0.322	695.186
			Max. Torque	12			0.656
L19	45.29 - 44.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-30.708	-1.153	0.620
			Max. Mx	8	-18.270	-786.904	0.141
			Max. My	2	-18.235	-0.290	794.041
			Max. Vy	8	22.185	-786.904	0.141
			Max. Vx	2	-22.603	-0.290	794.041

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	12			0.695
L20	44.29 - 39.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-32.283	-1.289	0.702
			Max. Mx	8	-19.599	-898.903	0.078
			Max. My	2	-19.568	-0.255	908.106
			Max. Vy	8	22.618	-898.903	0.078
			Max. Vx	2	-23.036	-0.255	908.106
			Max. Torque	12			0.736
L21	39.29 - 34.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-33.901	-1.430	0.786
			Max. Mx	8	-20.960	-1013.053	0.016
			Max. My	2	-20.932	-0.222	1024.341
			Max. Vy	8	23.047	-1013.053	0.016
			Max. Vx	2	-23.473	-0.222	1024.341
			Max. Torque	12			0.773
L22	34.29 - 33.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.171	-1.452	0.800
			Max. Mx	8	-21.182	-1031.287	0.007
			Max. My	2	-21.154	-0.216	1042.909
			Max. Vy	8	23.115	-1031.287	0.007
			Max. Vx	2	-23.546	-0.216	1042.909
			Max. Torque	12			0.778
L23	33.5 - 33.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.275	-1.460	0.804
			Max. Mx	8	-21.276	-1037.069	0.004
			Max. My	2	-21.250	-0.215	1048.798
			Max. Vy	8	23.132	-1037.069	0.004
			Max. Vx	2	-23.565	-0.215	1048.798
			Max. Torque	12			0.779
L24	33.25 - 32	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.793	-1.496	0.825
			Max. Mx	8	-21.694	-1066.073	-0.012
			Max. My	2	-21.667	-0.207	1078.341
			Max. Vy	8	23.266	-1066.073	-0.012
			Max. Vx	2	-23.707	-0.207	1078.341
			Max. Torque	12			0.786
L25	32 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.884	-1.503	0.830
			Max. Mx	8	-21.777	-1071.893	-0.015
			Max. My	2	-21.751	-0.205	1084.270
			Max. Vy	8	23.280	-1071.893	-0.015
			Max. Vx	2	-23.723	-0.205	1084.270
			Max. Torque	12			0.787
L26	31.75 - 28.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.069	-1.599	0.891
			Max. Mx	8	-22.725	-1148.071	-0.054
			Max. My	2	-22.701	-0.185	1161.892
			Max. Vy	8	23.593	-1148.071	-0.054
			Max. Vx	2	-24.050	-0.185	1161.892
			Max. Torque	12			0.808
L27	28.5 - 28.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.180	-1.606	0.896
			Max. Mx	8	-22.829	-1153.972	-0.057
			Max. My	2	-22.805	-0.184	1167.906
			Max. Vy	8	23.607	-1153.972	-0.057
			Max. Vx	2	-24.065	-0.184	1167.906
			Max. Torque	12			0.809
L28	28.25 - 27.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.402	-1.621	0.906
			Max. Mx	8	-23.009	-1165.793	-0.063
			Max. My	2	-22.985	-0.181	1179.953

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	23.660	-1165.793	-0.063
			Max. Vx	2	-24.120	-0.181	1179.953
			Max. Torque	12			0.812
L29	27.75 - 27.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.520	-1.629	0.911
			Max. Mx	8	-23.110	-1171.713	-0.066
			Max. My	2	-23.086	-0.179	1185.987
			Max. Vy	8	23.684	-1171.713	-0.066
			Max. Vx	2	-24.144	-0.179	1185.987
			Max. Torque	12			0.814
L30	27.5 - 27.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.620	-1.636	0.916
			Max. Mx	8	-23.191	-1177.640	-0.069
			Max. My	2	-23.167	-0.178	1192.027
			Max. Vy	8	23.709	-1177.640	-0.069
			Max. Vx	2	-24.170	-0.178	1192.027
			Max. Torque	12			0.816
L31	27.25 - 27.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.688	-1.641	0.920
			Max. Mx	8	-23.247	-1181.673	-0.071
			Max. My	2	-23.223	-0.177	1196.138
			Max. Vy	8	23.725	-1181.673	-0.071
			Max. Vx	2	-24.187	-0.177	1196.138
			Max. Torque	12			0.817
L32	27.08 - 26.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-36.778	-1.649	0.925
			Max. Mx	8	-23.317	-1187.610	-0.074
			Max. My	2	-23.294	-0.175	1202.189
			Max. Vy	8	23.749	-1187.610	-0.074
			Max. Vx	2	-24.212	-0.175	1202.189
			Max. Torque	12			0.818
L33	26.83 - 21.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.487	-1.809	1.046
			Max. Mx	8	-24.747	-1307.410	-0.133
			Max. My	2	-24.727	-0.147	1324.287
			Max. Vy	8	24.165	-1307.410	-0.133
			Max. Vx	2	-24.633	-0.147	1324.287
			Max. Torque	12			0.873
L34	21.83 - 16.83	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.190	-1.977	1.173
			Max. Mx	8	-26.216	-1429.142	-0.190
			Max. My	2	-26.201	-0.120	1448.328
			Max. Vy	8	24.532	-1429.142	-0.190
			Max. Vx	2	-25.000	-0.120	1448.328
			Max. Torque	12			0.941
L35	16.83 - 15.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.671	-2.029	1.200
			Max. Mx	8	-26.622	-1463.062	-0.206
			Max. My	2	-26.608	-0.113	1482.888
			Max. Vy	8	24.636	-1463.062	-0.206
			Max. Vx	2	-25.110	-0.113	1482.888
			Max. Torque	12			0.960
L36	15.45 - 15.2	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.765	-2.038	1.205
			Max. Mx	8	-26.721	-1469.220	-0.209
			Max. My	2	-26.708	-0.111	1489.164
			Max. Vy	8	24.634	-1469.220	-0.209
			Max. Vx	2	-25.110	-0.111	1489.164
			Max. Torque	12			0.964
L37	15.2 - 13.4	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.471	-2.106	1.241

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-27.313	-1513.695	-0.229
			Max. My	2	-27.301	-0.102	1534.492
			Max. Vy	8	24.786	-1513.695	-0.229
			Max. Vx	2	-25.271	-0.102	1534.492
			Max. Torque	12			0.989
L38	13.4 - 13.15	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-41.570	-2.116	1.246
			Max. Mx	8	-27.419	-1519.891	-0.232
			Max. My	2	-27.407	-0.101	1540.808
			Max. Vy	8	24.782	-1519.891	-0.232
			Max. Vx	2	-25.268	-0.101	1540.808
			Max. Torque	12			0.992
L39	13.15 - 8.15	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-43.515	-2.287	1.367
			Max. Mx	8	-29.119	-1644.751	-0.288
			Max. My	2	-29.112	-0.077	1668.084
			Max. Vy	8	25.153	-1644.751	-0.288
			Max. Vx	2	-25.647	-0.077	1668.084
			Max. Torque	12			1.053
L40	8.15 - 6.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.166	-2.350	1.400
			Max. Mx	8	-29.682	-1686.352	-0.306
			Max. My	2	-29.676	-0.070	1710.496
			Max. Vy	8	25.284	-1686.352	-0.306
			Max. Vx	2	-25.786	-0.070	1710.496
			Max. Torque	12			1.077
L41	6.5 - 6.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-44.271	-2.359	1.405
			Max. Mx	8	-29.793	-1692.673	-0.309
			Max. My	2	-29.788	-0.069	1716.940
			Max. Vy	8	25.281	-1692.673	-0.309
			Max. Vx	2	-25.784	-0.069	1716.940
			Max. Torque	12			1.080
L42	6.25 - 4.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45.025	-2.428	1.442
			Max. Mx	8	-30.441	-1738.322	-0.328
			Max. My	2	-30.437	-0.061	1763.491
			Max. Vy	20	-25.448	1734.715	1.377
			Max. Vx	2	-25.952	-0.061	1763.491
			Max. Torque	12			1.106
L43	4.45 - 4.2	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45.123	-2.437	1.447
			Max. Mx	8	-30.547	-1744.681	-0.331
			Max. My	2	-30.543	-0.060	1769.977
			Max. Vy	20	-25.446	1741.070	1.384
			Max. Vx	2	-25.949	-0.060	1769.977
			Max. Torque	12			1.106
L44	4.2 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-46.748	-2.581	1.547
			Max. Mx	8	-32.004	-1852.214	-0.376
			Max. My	2	-32.004	-0.043	1879.643
			Max. Vy	20	-25.777	1848.531	1.499
			Max. Vx	2	-26.277	-0.043	1879.643
			Max. Torque	12			1.106

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	32	46.748	-3.012	-5.222
	Max. H_x	20	32.017	25.761	0.019
	Max. H_z	2	32.017	0.019	26.260
	Max. M_x	2	1879.643	0.019	26.260
	Max. M_z	8	1852.214	-25.744	-0.019
	Max. Torsion	12	1.106	-13.726	-23.802
	Min. Vert	5	24.013	-12.803	22.242
	Min. H_x	8	32.017	-25.744	-0.019
	Min. H_z	14	32.017	-0.019	-26.257
	Min. M_x	14	-1875.013	-0.019	-26.257
	Min. M_z	20	-1848.531	25.761	0.019
	Min. Torsion	24	-1.105	13.660	23.688

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.681	0.000	0.000	-0.451	-0.791	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	32.017	-0.019	-26.260	-1879.643	-0.043	0.536
0.9 Dead+1.0 Wind 0 deg - No Ice	24.013	-0.019	-26.260	-1860.210	0.205	0.535
1.2 Dead+1.0 Wind 30 deg - No Ice	32.017	12.803	-22.242	-1604.806	-924.824	0.305
0.9 Dead+1.0 Wind 30 deg - No Ice	24.013	12.803	-22.242	-1588.108	-915.032	0.304
1.2 Dead+1.0 Wind 60 deg - No Ice	32.017	22.285	-12.882	-927.192	-1603.725	0.084
0.9 Dead+1.0 Wind 60 deg - No Ice	24.013	22.285	-12.882	-917.491	-1586.944	0.084
1.2 Dead+1.0 Wind 90 deg - No Ice	32.017	25.744	0.019	0.376	-1852.214	-0.160
0.9 Dead+1.0 Wind 90 deg - No Ice	24.013	25.744	0.019	0.516	-1832.872	-0.160
1.2 Dead+1.0 Wind 120 deg - No Ice	32.017	22.596	13.084	932.809	-1613.526	-0.371
0.9 Dead+1.0 Wind 120 deg - No Ice	24.013	22.596	13.084	923.365	-1596.694	-0.371
1.2 Dead+1.0 Wind 150 deg - No Ice	32.017	13.726	23.802	1661.119	-959.065	-1.106
0.9 Dead+1.0 Wind 150 deg - No Ice	24.013	13.726	23.802	1644.396	-949.086	-1.106
1.2 Dead+1.0 Wind 180 deg - No Ice	32.017	0.019	26.257	1875.013	-1.918	-0.535
0.9 Dead+1.0 Wind 180 deg - No Ice	24.013	0.019	26.257	1855.896	-1.661	-0.535
1.2 Dead+1.0 Wind 210 deg - No Ice	32.017	-12.957	22.508	1609.059	925.965	-0.303
0.9 Dead+1.0 Wind 210 deg - No Ice	24.013	-12.957	22.508	1592.632	916.669	-0.302
1.2 Dead+1.0 Wind 240 deg - No Ice	32.017	-22.584	13.055	930.168	1608.862	-0.082
0.9 Dead+1.0 Wind 240 deg - No Ice	24.013	-22.584	13.055	920.740	1592.556	-0.082
1.2 Dead+1.0 Wind 270 deg - No Ice	32.017	-25.761	-0.019	-1.499	1848.531	0.160

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 270 deg - No Ice	24.013	-25.761	-0.019	-1.349	1829.710	0.159
1.2 Dead+1.0 Wind 300 deg - No Ice	32.017	-22.487	-13.021	-932.683	1609.398	0.369
0.9 Dead+1.0 Wind 300 deg - No Ice	24.013	-22.487	-13.021	-922.952	1593.079	0.369
1.2 Dead+1.0 Wind 330 deg - No Ice	32.017	-13.660	-23.688	-1660.775	956.261	1.105
0.9 Dead+1.0 Wind 330 deg - No Ice	24.013	-13.660	-23.688	-1643.763	946.787	1.104
1.2 Dead+1.0 Ice+1.0 Temp	46.748	0.000	-0.000	-1.547	-2.581	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	46.748	-0.005	-5.711	-433.852	-2.376	0.100
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	46.748	2.802	-4.869	-372.665	-216.337	0.054
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	46.748	4.880	-2.820	-216.019	-373.653	0.009
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	46.748	5.638	0.005	-1.309	-431.210	-0.038
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	46.748	4.936	2.859	214.086	-375.254	-0.078
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	46.748	3.012	5.222	382.004	-223.894	-0.236
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	46.748	0.005	5.710	429.990	-2.943	-0.100
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	46.748	-2.830	4.918	370.484	211.598	-0.054
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	46.748	-4.935	2.852	213.606	369.671	-0.009
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	46.748	-5.641	-0.005	-1.876	425.561	0.038
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	46.748	-4.916	-2.848	-217.039	369.533	0.078
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	46.748	-3.000	-5.201	-384.925	218.425	0.236
Dead+Wind 0 deg - Service	26.681	-0.004	-6.187	-441.011	-0.598	0.128
Dead+Wind 30 deg - Service	26.681	3.016	-5.240	-376.564	-217.403	0.073
Dead+Wind 60 deg - Service	26.681	5.250	-3.035	-217.705	-376.564	0.020
Dead+Wind 90 deg - Service	26.681	6.065	0.004	-0.247	-434.817	-0.038
Dead+Wind 120 deg - Service	26.681	5.323	3.082	218.355	-378.867	-0.088
Dead+Wind 150 deg - Service	26.681	3.234	5.608	389.130	-225.451	-0.263
Dead+Wind 180 deg - Service	26.681	0.004	6.186	439.253	-1.038	-0.128
Dead+Wind 210 deg - Service	26.681	-3.053	5.303	376.894	216.496	-0.073
Dead+Wind 240 deg - Service	26.681	-5.321	3.076	217.735	376.597	-0.020
Dead+Wind 270 deg - Service	26.681	-6.069	-0.004	-0.687	432.777	0.038
Dead+Wind 300 deg - Service	26.681	-5.298	-3.068	-218.996	376.722	0.088
Dead+Wind 330 deg - Service	26.681	-3.218	-5.581	-389.720	223.616	0.263

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-26.681	0.000	0.000	26.681	0.000	0.000%
2	-0.019	-32.017	-26.260	0.019	32.017	26.260	0.000%
3	-0.019	-24.013	-26.260	0.019	24.013	26.260	0.000%
4	12.803	-32.017	-22.242	-12.803	32.017	22.242	0.000%
5	12.803	-24.013	-22.242	-12.803	24.013	22.242	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
6	22.285	-32.017	-12.882	-22.285	32.017	12.882	0.000%
7	22.285	-24.013	-12.882	-22.285	24.013	12.882	0.000%
8	25.744	-32.017	0.019	-25.744	32.017	-0.019	0.000%
9	25.744	-24.013	0.019	-25.744	24.013	-0.019	0.000%
10	22.596	-32.017	13.084	-22.596	32.017	-13.084	0.000%
11	22.596	-24.013	13.084	-22.596	24.013	-13.084	0.000%
12	13.726	-32.017	23.802	-13.726	32.017	-23.802	0.000%
13	13.726	-24.013	23.802	-13.726	24.013	-23.802	0.000%
14	0.019	-32.017	26.257	-0.019	32.017	-26.257	0.000%
15	0.019	-24.013	26.257	-0.019	24.013	-26.257	0.000%
16	-12.957	-32.017	22.508	12.957	32.017	-22.508	0.000%
17	-12.957	-24.013	22.508	12.957	24.013	-22.508	0.000%
18	-22.584	-32.017	13.055	22.584	32.017	-13.055	0.000%
19	-22.584	-24.013	13.055	22.584	24.013	-13.055	0.000%
20	-25.761	-32.017	-0.019	25.761	32.017	0.019	0.000%
21	-25.761	-24.013	-0.019	25.761	24.013	0.019	0.000%
22	-22.487	-32.017	-13.021	22.487	32.017	13.021	0.000%
23	-22.487	-24.013	-13.021	22.487	24.013	13.021	0.000%
24	-13.660	-32.017	-23.688	13.660	32.017	23.688	0.000%
25	-13.660	-24.013	-23.688	13.660	24.013	23.688	0.000%
26	0.000	-46.748	0.000	-0.000	46.748	0.000	0.000%
27	-0.005	-46.748	-5.711	0.005	46.748	5.711	0.000%
28	2.802	-46.748	-4.869	-2.802	46.748	4.869	0.000%
29	4.880	-46.748	-2.820	-4.880	46.748	2.820	0.000%
30	5.638	-46.748	0.005	-5.638	46.748	-0.005	0.000%
31	4.936	-46.748	2.859	-4.936	46.748	-2.859	0.000%
32	3.012	-46.748	5.222	-3.012	46.748	-5.222	0.000%
33	0.005	-46.748	5.710	-0.005	46.748	-5.710	0.000%
34	-2.830	-46.748	4.918	2.830	46.748	-4.918	0.000%
35	-4.935	-46.748	2.852	4.935	46.748	-2.852	0.000%
36	-5.641	-46.748	-0.005	5.641	46.748	0.005	0.000%
37	-4.916	-46.748	-2.848	4.916	46.748	2.848	0.000%
38	-3.000	-46.748	-5.201	3.000	46.748	5.201	0.000%
39	-0.004	-26.681	-6.187	0.004	26.681	6.187	0.000%
40	3.016	-26.681	-5.240	-3.016	26.681	5.240	0.000%
41	5.250	-26.681	-3.035	-5.250	26.681	3.035	0.000%
42	6.065	-26.681	0.004	-6.065	26.681	-0.004	0.000%
43	5.323	-26.681	3.082	-5.323	26.681	-3.082	0.000%
44	3.234	-26.681	5.608	-3.234	26.681	-5.608	0.000%
45	0.004	-26.681	6.186	-0.004	26.681	-6.186	0.000%
46	-3.053	-26.681	5.303	3.053	26.681	-5.303	0.000%
47	-5.321	-26.681	3.076	5.321	26.681	-3.076	0.000%
48	-6.069	-26.681	-0.004	6.069	26.681	0.004	0.000%
49	-5.298	-26.681	-3.068	5.298	26.681	3.068	0.000%
50	-3.218	-26.681	-5.581	3.218	26.681	5.581	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00041170
3	Yes	5	0.00000001	0.00017534
4	Yes	6	0.00000001	0.00066315
5	Yes	6	0.00000001	0.00019469
6	Yes	6	0.00000001	0.00065418

7	Yes	6	0.00000001	0.00019163
8	Yes	5	0.00000001	0.00018563
9	Yes	5	0.00000001	0.00006943
10	Yes	6	0.00000001	0.00064976
11	Yes	6	0.00000001	0.00018978
12	Yes	6	0.00000001	0.00068781
13	Yes	6	0.00000001	0.00020061
14	Yes	5	0.00000001	0.00043528
15	Yes	5	0.00000001	0.00018596
16	Yes	6	0.00000001	0.00064825
17	Yes	6	0.00000001	0.00018969
18	Yes	6	0.00000001	0.00065728
19	Yes	6	0.00000001	0.00019270
20	Yes	5	0.00000001	0.00020209
21	Yes	5	0.00000001	0.00007769
22	Yes	6	0.00000001	0.00066613
23	Yes	6	0.00000001	0.00019551
24	Yes	6	0.00000001	0.00065353
25	Yes	6	0.00000001	0.00018902
26	Yes	4	0.00000001	0.00024325
27	Yes	6	0.00000001	0.00042537
28	Yes	6	0.00000001	0.00048613
29	Yes	6	0.00000001	0.00048593
30	Yes	6	0.00000001	0.00042449
31	Yes	6	0.00000001	0.00048348
32	Yes	6	0.00000001	0.00049191
33	Yes	6	0.00000001	0.00042200
34	Yes	6	0.00000001	0.00047733
35	Yes	6	0.00000001	0.00047798
36	Yes	6	0.00000001	0.00041904
37	Yes	6	0.00000001	0.00048153
38	Yes	6	0.00000001	0.00048792
39	Yes	4	0.00000001	0.00091493
40	Yes	5	0.00000001	0.00026083
41	Yes	5	0.00000001	0.00025198
42	Yes	4	0.00000001	0.00074999
43	Yes	5	0.00000001	0.00024681
44	Yes	5	0.00000001	0.00028398
45	Yes	4	0.00000001	0.00091667
46	Yes	5	0.00000001	0.00024493
47	Yes	5	0.00000001	0.00025339
48	Yes	4	0.00000001	0.00074848
49	Yes	5	0.00000001	0.00026223
50	Yes	5	0.00000001	0.00024900

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 93	18.060	50	1.845	0.002
L2	93 - 88	16.130	50	1.838	0.002
L3	88 - 82.79	14.232	50	1.780	0.002
L4	85.21 - 80.21	13.208	50	1.724	0.002
L5	80.21 - 75.21	11.439	50	1.638	0.002
L6	75.21 - 70.21	9.790	50	1.508	0.002
L7	70.21 - 65.21	8.288	50	1.356	0.002
L8	65.21 - 60.21	6.958	50	1.183	0.002
L9	60.21 - 59.17	5.819	50	0.989	0.001
L10	59.17 - 58.9	5.609	50	0.947	0.001

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L11	58.9 - 58.75	5.555	50	0.942	0.001
L12	58.75 - 54.08	5.526	50	0.939	0.001
L13	54.08 - 53.83	4.657	50	0.836	0.001
L14	53.83 - 52.91	4.613	50	0.832	0.001
L15	52.91 - 52.66	4.454	50	0.817	0.001
L16	52.66 - 52.17	4.412	50	0.814	0.001
L17	52.17 - 51.92	4.329	50	0.806	0.001
L18	51.92 - 45.29	4.287	50	0.802	0.001
L19	48.71 - 44.29	3.766	44	0.746	0.001
L20	44.29 - 39.29	3.094	44	0.699	0.001
L21	39.29 - 34.29	2.409	44	0.610	0.001
L22	34.29 - 33.5	1.818	44	0.520	0.000
L23	33.5 - 33.25	1.733	44	0.506	0.000
L24	33.25 - 32	1.707	44	0.502	0.000
L25	32 - 31.75	1.577	44	0.486	0.000
L26	31.75 - 28.5	1.552	44	0.482	0.000
L27	28.5 - 28.25	1.242	44	0.429	0.000
L28	28.25 - 27.75	1.219	44	0.426	0.000
L29	27.75 - 27.5	1.175	44	0.420	0.000
L30	27.5 - 27.25	1.153	44	0.418	0.000
L31	27.25 - 27.08	1.131	44	0.414	0.000
L32	27.08 - 26.83	1.116	44	0.412	0.000
L33	26.83 - 21.83	1.095	44	0.408	0.000
L34	21.83 - 16.83	0.711	44	0.326	0.000
L35	16.83 - 15.45	0.414	44	0.243	0.000
L36	15.45 - 15.2	0.347	44	0.221	0.000
L37	15.2 - 13.4	0.335	44	0.215	0.000
L38	13.4 - 13.15	0.259	44	0.189	0.000
L39	13.15 - 8.15	0.250	44	0.185	0.000
L40	8.15 - 6.5	0.095	44	0.111	0.000
L41	6.5 - 6.25	0.060	44	0.087	0.000
L42	6.25 - 4.45	0.056	44	0.084	0.000
L43	4.45 - 4.2	0.028	44	0.061	0.000
L44	4.2 - 0	0.025	44	0.058	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.000	Miscellaneous [NA 510-1]	50	18.060	1.845	0.002	9307
94.000	APXVTM14-ALU-I20 w/ Mount Pipe	50	16.515	1.842	0.002	9307
89.000	APXV18-209014-C w/ Mount Pipe	50	14.606	1.797	0.002	4089
74.000	7770.00 w/ Mount Pipe	50	9.412	1.473	0.002	1965
67.000	(2) LPA-80063/6CFX2 w/ Mount Pipe	50	7.413	1.246	0.002	1621
52.000	KS24019-L112A	50	4.300	0.804	0.001	3385

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	98 - 93	76.917	24	7.881	0.009
L2	93 - 88	68.714	24	7.851	0.009
L3	88 - 82.79	60.647	24	7.605	0.009
L4	85.21 - 80.21	56.291	24	7.368	0.009
L5	80.21 - 75.21	48.767	24	6.999	0.009
L6	75.21 - 70.21	41.750	24	6.444	0.008
L7	70.21 - 65.21	35.354	24	5.791	0.008
L8	65.21 - 60.21	29.685	24	5.051	0.007
L9	60.21 - 59.17	24.830	24	4.224	0.005
L10	59.17 - 58.9	23.931	24	4.047	0.004
L11	58.9 - 58.75	23.703	24	4.023	0.004
L12	58.75 - 54.08	23.577	24	4.009	0.004
L13	54.08 - 53.83	19.872	24	3.572	0.003
L14	53.83 - 52.91	19.686	24	3.555	0.003
L15	52.91 - 52.66	19.008	24	3.491	0.003
L16	52.66 - 52.17	18.825	24	3.475	0.003
L17	52.17 - 51.92	18.471	24	3.444	0.003
L18	51.92 - 45.29	18.291	24	3.426	0.003
L19	48.71 - 44.29	16.071	12	3.185	0.003
L20	44.29 - 39.29	13.205	12	2.984	0.003
L21	39.29 - 34.29	10.281	12	2.606	0.002
L22	34.29 - 33.5	7.757	12	2.219	0.002
L23	33.5 - 33.25	7.395	12	2.159	0.002
L24	33.25 - 32	7.282	12	2.145	0.002
L25	32 - 31.75	6.730	12	2.077	0.002
L26	31.75 - 28.5	6.622	12	2.060	0.002
L27	28.5 - 28.25	5.298	12	1.832	0.002
L28	28.25 - 27.75	5.202	12	1.820	0.001
L29	27.75 - 27.5	5.013	12	1.794	0.001
L30	27.5 - 27.25	4.919	12	1.783	0.001
L31	27.25 - 27.08	4.826	12	1.768	0.001
L32	27.08 - 26.83	4.764	12	1.758	0.001
L33	26.83 - 21.83	4.672	12	1.741	0.001
L34	21.83 - 16.83	3.034	12	1.389	0.001
L35	16.83 - 15.45	1.765	12	1.036	0.001
L36	15.45 - 15.2	1.480	12	0.941	0.001
L37	15.2 - 13.4	1.431	12	0.917	0.001
L38	13.4 - 13.15	1.106	12	0.806	0.001
L39	13.15 - 8.15	1.064	12	0.791	0.001
L40	8.15 - 6.5	0.403	12	0.474	0.000
L41	6.5 - 6.25	0.257	12	0.373	0.000
L42	6.25 - 4.45	0.238	12	0.359	0.000
L43	4.45 - 4.2	0.121	12	0.260	0.000
L44	4.2 - 0	0.108	12	0.245	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
98.000	Miscellaneous [NA 510-1]	24	76.917	7.881	0.009	2260
94.000	APXVTM14-ALU-I20 w/ Mount Pipe	24	70.350	7.868	0.009	2260
89.000	APXV18-209014-C w/ Mount Pipe	24	62.237	7.677	0.009	990
74.000	7770.00 w/ Mount Pipe	24	40.141	6.292	0.008	470
67.000	(2) LPA-80063/6CFX2 w/ Mount Pipe	24	31.625	5.321	0.007	386

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
52.000	KS24019-L112A	24	18.349	3.431	0.003	798

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	98 - 93 (1)	TP13.078x12x0.188	5.000	0.000	0.0	7.672	-3.438	448.789	0.008
L2	93 - 88 (2)	TP14.156x13.078x0.188	5.000	0.000	0.0	8.313	-5.634	486.327	0.012
L3	88 - 82.79 (3)	TP15.28x14.156x0.188	5.210	0.000	0.0	8.671	-5.783	507.274	0.011
L4	82.79 - 80.21 (4)	TP15.445x14.383x0.25	5.000	0.000	0.0	12.057	-6.201	705.342	0.009
L5	80.21 - 75.21 (5)	TP16.507x15.445x0.25	5.000	0.000	0.0	12.900	-6.587	754.627	0.009
L6	75.21 - 70.21 (6)	TP17.568x16.507x0.25	5.000	0.000	0.0	13.742	-9.904	803.912	0.012
L7	70.21 - 65.21 (7)	TP18.63x17.568x0.25	5.000	0.000	0.0	14.585	-13.199	853.198	0.015
L8	65.21 - 60.21 (8)	TP19.692x18.63x0.25	5.000	0.000	0.0	15.427	-13.968	902.483	0.015
L9	60.21 - 59.17 (9)	TP19.913x19.692x0.25	1.040	0.000	0.0	15.602	-14.133	912.734	0.015
L10	59.17 - 58.9 (10)	TP19.97x19.913x0.513	0.270	0.000	0.0	31.651	-14.212	1851.580	0.008
L11	58.9 - 58.75 (11)	TP20.002x19.97x0.513	0.150	0.000	0.0	31.703	-14.242	1854.610	0.008
L12	58.75 - 54.08 (12)	TP20.993x20.002x0.5	4.670	0.000	0.0	32.523	-15.108	1902.600	0.008
L13	54.08 - 53.83 (13)	TP21.047x20.993x0.7	0.250	0.000	0.0	45.206	-15.165	2644.550	0.006
L14	53.83 - 52.91 (14)	TP21.242x21.047x0.7	0.920	0.000	0.0	45.640	-15.374	2669.940	0.006
L15	52.91 - 52.66 (15)	TP21.295x21.242x0.775	0.250	0.000	0.0	50.476	-15.447	2952.850	0.005
L16	52.66 - 52.17 (16)	TP21.399x21.295x0.775	0.490	0.000	0.0	50.732	-15.569	2967.830	0.005
L17	52.17 - 51.92 (17)	TP21.452x21.399x0.688	0.250	0.000	0.0	45.311	-15.711	2650.700	0.006
L18	51.92 - 45.29 (18)	TP22.86x21.452x0.663	6.630	0.000	0.0	45.149	-16.474	2641.230	0.006
L19	45.29 - 44.29 (19)	TP22.574x21.634x0.738	4.420	0.000	0.0	51.116	-18.203	2990.310	0.006
L20	44.29 - 39.29 (20)	TP23.638x22.574x0.713	5.000	0.000	0.0	51.847	-19.534	3033.020	0.006
L21	39.29 - 34.29 (21)	TP24.703x23.638x0.688	5.000	0.000	0.0	52.404	-20.898	3065.630	0.007
L22	34.29 - 33.5 (22)	TP24.871x24.703x0.688	0.790	0.000	0.0	52.771	-21.120	3087.090	0.007
L23	33.5 - 33.25 (23)	TP24.924x24.871x0.988	0.250	0.000	0.0	75.024	-21.216	4388.930	0.005
L24	33.25 - 32 (24)	TP25.19x24.924x0.988	1.250	0.000	0.0	75.858	-21.633	4437.710	0.005
L25	32 - 31.75 (25)	TP25.243x25.19x0.763	0.250	0.000	0.0	59.247	-21.718	3465.970	0.006

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L26	31.75 - 28.5 (26)	TP25.935x25.243x0.75	3.250	0.000	0.0	59.952	-22.668	3507.210	0.006
L27	28.5 - 28.25 (27)	TP25.988x25.935x1.038	0.250	0.000	0.0	82.162	-22.773	4806.510	0.005
L28	28.25 - 27.75 (28)	TP26.094x25.988x1.038	0.500	0.000	0.0	82.513	-22.953	4827.010	0.005
L29	27.75 - 27.5 (29)	TP26.148x26.094x1.213	0.250	0.000	0.0	95.962	-23.054	5613.780	0.004
L30	27.5 - 27.25 (30)	TP26.201x26.148x0.9	0.250	0.000	0.0	72.274	-23.135	4228.040	0.005
L31	27.25 - 27.08 (31)	TP26.237x26.201x0.9	0.170	0.000	0.0	72.378	-23.192	4234.090	0.005
L32	27.08 - 26.83 (32)	TP26.29x26.237x0.738	0.250	0.000	0.0	59.814	-23.262	3499.140	0.007
L33	26.83 - 21.83 (33)	TP27.354x26.29x0.725	5.000	0.000	0.0	61.278	-24.699	3584.760	0.007
L34	21.83 - 16.83 (34)	TP28.418x27.354x0.7	5.000	0.000	0.0	61.585	-26.177	3602.700	0.007
L35	16.83 - 15.45 (35)	TP28.712x28.418x0.7	1.380	0.000	0.0	62.237	-26.584	3640.870	0.007
L36	15.45 - 15.2 (36)	TP28.765x28.712x0.488	0.250	0.000	0.0	43.755	-26.684	2559.660	0.010
L37	15.2 - 13.4 (37)	TP29.148x28.765x0.775	1.800	0.000	0.0	69.794	-27.279	4082.950	0.007
L38	13.4 - 13.15 (38)	TP29.201x29.148x0.775	0.250	0.000	0.0	69.925	-27.387	4090.610	0.007
L39	13.15 - 8.15 (39)	TP30.266x29.201x0.75	5.000	0.000	0.0	70.262	-29.097	4110.310	0.007
L40	8.15 - 6.5 (40)	TP30.617x30.266x0.75	1.650	0.000	0.0	71.098	-29.664	4159.210	0.007
L41	6.5 - 6.25 (41)	TP30.67x30.617x0.838	0.250	0.000	0.0	79.301	-29.777	4639.120	0.006
L42	6.25 - 4.45 (42)	TP31.053x30.67x0.825	1.800	0.000	0.0	79.154	-30.427	4630.480	0.007
L43	4.45 - 4.2 (43)	TP31.106x31.053x0.788	0.250	0.000	0.0	75.782	-30.536	4433.260	0.007
L44	4.2 - 0 (44)	TP32x31.106x0.775	4.200	0.000	0.0	76.809	-32.003	4493.320	0.007

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	98 - 93 (1)	TP13.078x12x0.188	16.504	150.088	0.110	0.000	150.088	0.000
L2	93 - 88 (2)	TP14.156x13.078x0.188	52.002	176.441	0.295	0.000	176.441	0.000
L3	88 - 82.79 (3)	TP15.28x14.156x0.188	78.900	192.072	0.411	0.000	192.072	0.000
L4	82.79 - 80.21 (4)	TP15.445x14.383x0.25	127.923	277.527	0.461	0.000	277.527	0.000
L5	80.21 - 75.21 (5)	TP16.507x15.445x0.25	177.917	318.003	0.559	0.000	318.003	0.000
L6	75.21 - 70.21 (6)	TP17.568x16.507x0.25	257.878	361.233	0.714	0.000	361.233	0.000
L7	70.21 - 65.21 (7)	TP18.63x17.568x0.25	343.186	407.217	0.843	0.000	407.217	0.000
L8	65.21 - 60.21 (8)	TP19.692x18.63x0.25	447.558	455.956	0.982	0.000	455.956	0.000
L9	60.21 - 59.17 (9)	TP19.913x19.692x0.25	469.489	466.439	1.007	0.000	466.439	0.000
L10	59.17 - 58.9 (10)	TP19.97x19.913x0.513	475.197	923.917	0.514	0.000	923.917	0.000
L11	58.9 - 58.75	TP20.002x19.97x0.513	478.370	926.983	0.516	0.000	926.983	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 $\frac{M_{uy}}{\phi M_{ny}}$
L12	58.75 - 54.08 (11)	TP20.993x20.002x0.5	578.048	1001.825	0.577	0.000	1001.825	0.000
L13	54.08 - 53.83 (12)	TP21.047x20.993x0.7	583.467	1369.142	0.426	0.000	1369.142	0.000
L14	53.83 - 52.91 (13)	TP21.242x21.047x0.7	603.452	1396.000	0.432	0.000	1396.000	0.000
L15	52.91 - 52.66 (14)	TP21.295x21.242x0.775	608.901	1536.792	0.396	0.000	1536.792	0.000
L16	52.66 - 52.17 (15)	TP21.399x21.295x0.775	619.602	1552.700	0.399	0.000	1552.700	0.000
L17	52.17 - 51.92 (16)	TP21.452x21.399x0.688	625.092	1402.275	0.446	0.000	1402.275	0.000
L18	51.92 - 45.29 (17)	TP22.86x21.452x0.663	696.246	1447.983	0.481	0.000	1447.983	0.000
L19	45.29 - 44.29 (18)	TP22.574x21.634x0.738	796.418	1662.567	0.479	0.000	1662.567	0.000
L20	44.29 - 39.29 (19)	TP23.638x22.574x0.713	912.533	1775.042	0.514	0.000	1775.042	0.000
L21	39.29 - 34.29 (20)	TP24.703x23.638x0.688	1031.375	1883.825	0.547	0.000	1883.825	0.000
L22	34.29 - 33.5 (21)	TP24.871x24.703x0.688	1050.400	1910.667	0.550	0.000	1910.667	0.000
L23	33.5 - 33.25 (22)	TP24.924x24.871x0.988	1056.433	2655.558	0.398	0.000	2655.558	0.000
L24	33.25 - 32 (23)	TP25.19x24.924x0.988	1086.725	2716.100	0.400	0.000	2716.100	0.000
L25	32 - 31.75 (24)	TP25.243x25.19x0.763	1092.808	2165.825	0.505	0.000	2165.825	0.000
L26	31.75 - 28.5 (25)	TP25.935x25.243x0.75	1172.508	2257.625	0.519	0.000	2257.625	0.000
L27	28.5 - 28.25 (26)	TP25.988x25.935x1.038	1178.692	3030.475	0.389	0.000	3030.475	0.000
L28	28.25 - 27.75 (27)	TP26.094x25.988x1.038	1191.075	3056.900	0.390	0.000	3056.900	0.000
L29	27.75 - 27.5 (28)	TP26.148x26.094x1.213	1197.283	3513.517	0.341	0.000	3513.517	0.000
L30	27.5 - 27.25 (29)	TP26.201x26.148x0.9	1203.492	2718.875	0.443	0.000	2718.875	0.000
L31	27.25 - 27.08 (30)	TP26.237x26.201x0.9	1207.725	2726.792	0.443	0.000	2726.792	0.000
L32	27.08 - 26.83 (31)	TP26.29x26.237x0.738	1213.950	2287.367	0.531	0.000	2287.367	0.000
L33	26.83 - 21.83 (32)	TP27.354x26.29x0.725	1339.742	2445.958	0.548	0.000	2445.958	0.000
L34	21.83 - 16.83 (33)	TP28.418x27.354x0.7	1467.950	2563.650	0.573	0.000	2563.650	0.000
L35	16.83 - 15.45 (34)	TP28.712x28.418x0.7	1503.758	2618.942	0.574	0.000	2618.942	0.000
L36	15.45 - 15.2 (35)	TP28.765x28.712x0.488	1510.283	1872.833	0.806	0.000	1872.833	0.000
L37	15.2 - 13.4 (36)	TP29.148x28.765x0.775	1557.450	2968.083	0.525	0.000	2968.083	0.000
L38	13.4 - 13.15 (37)	TP29.201x29.148x0.775	1564.025	2979.375	0.525	0.000	2979.375	0.000
L39	13.15 - 8.15 (38)	TP30.266x29.201x0.75	1696.775	3114.042	0.545	0.000	3114.042	0.000
L40	8.15 - 6.5 (39)	TP30.617x30.266x0.75	1741.108	3189.508	0.546	0.000	3189.508	0.000
L41	6.5 - 6.25 (40)	TP30.67x30.617x0.838	1747.842	3543.208	0.493	0.000	3543.208	0.000
L42	6.25 - 4.45 (41)	TP31.053x30.67x0.825	1796.558	3586.217	0.501	0.000	3586.217	0.000
L43	4.45 - 4.2 (42)	TP31.106x31.053x0.788	1803.350	3448.208	0.523	0.000	3448.208	0.000
L44	4.2 - 0 (43)	TP32x31.106x0.775	1918.100	3603.450	0.532	0.000	3603.450	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	98 - 93 (1)	TP13.078x12x0.188	5.826	134.637	0.043	0.000	151.992	0.000
L2	93 - 88 (2)	TP14.156x13.078x0.188	9.592	145.898	0.066	0.000	178.482	0.000
L3	88 - 82.79 (3)	TP15.28x14.156x0.188	9.698	152.182	0.064	0.000	194.188	0.000
L4	82.79 - 80.21 (4)	TP15.445x14.383x0.25	9.912	211.603	0.047	0.000	281.577	0.000
L5	80.21 - 75.21 (5)	TP16.507x15.445x0.25	10.099	226.388	0.045	0.000	322.303	0.000
L6	75.21 - 70.21 (6)	TP17.568x16.507x0.25	14.987	241.174	0.062	0.195	365.777	0.001
L7	70.21 - 65.21 (7)	TP18.63x17.568x0.25	20.711	253.002	0.082	0.600	412.001	0.001
L8	65.21 - 60.21 (8)	TP19.692x18.63x0.25	21.065	267.788	0.079	0.685	460.974	0.001
L9	60.21 - 59.17 (9)	TP19.913x19.692x0.25	21.144	270.745	0.078	0.692	471.506	0.001
L10	59.17 - 58.9 (10)	TP19.97x19.913x0.513	21.146	553.838	0.038	0.692	946.525	0.001
L11	58.9 - 58.75 (11)	TP20.002x19.97x0.513	21.157	556.384	0.038	0.692	949.625	0.001
L12	58.75 - 54.08 (12)	TP20.993x20.002x0.5	21.538	563.876	0.038	0.692	1024.392	0.001
L13	54.08 - 53.83 (13)	TP21.047x20.993x0.7	21.671	793.365	0.027	0.787	1413.658	0.001
L14	53.83 - 52.91 (14)	TP21.242x21.047x0.7	21.788	800.983	0.027	0.796	1440.933	0.001
L15	52.91 - 52.66 (15)	TP21.295x21.242x0.775	21.815	885.856	0.025	0.798	1591.917	0.001
L16	52.66 - 52.17 (16)	TP21.399x21.295x0.775	21.876	890.348	0.025	0.802	1608.100	0.000
L17	52.17 - 51.92 (17)	TP21.452x21.399x0.688	21.984	795.209	0.028	0.802	1446.058	0.001
L18	51.92 - 45.29 (18)	TP22.86x21.452x0.663	22.367	792.370	0.028	0.655	1489.933	0.000
L19	45.29 - 44.29 (19)	TP22.574x21.634x0.738	22.962	897.093	0.026	0.693	1715.575	0.000
L20	44.29 - 39.29 (20)	TP23.638x22.574x0.713	23.512	909.907	0.026	0.734	1826.858	0.000
L21	39.29 - 34.29 (21)	TP24.703x23.638x0.688	24.054	919.688	0.026	0.772	1934.217	0.000
L22	34.29 - 33.5 (22)	TP24.871x24.703x0.688	24.140	926.127	0.026	0.776	1961.392	0.000
L23	33.5 - 33.25 (23)	TP24.924x24.871x0.988	24.163	1316.680	0.018	0.777	2760.058	0.000
L24	33.25 - 32 (24)	TP25.19x24.924x0.988	24.324	1331.310	0.018	0.785	2821.750	0.000
L25	32 - 31.75 (25)	TP25.243x25.19x0.763	24.344	1039.790	0.023	0.786	2229.200	0.000
L26	31.75 - 28.5 (26)	TP25.935x25.243x0.75	24.724	1052.160	0.023	0.806	2320.608	0.000
L27	28.5 - 28.25 (27)	TP25.988x25.935x1.038	24.743	1441.950	0.017	0.808	3150.717	0.000
L28	28.25 - 27.75 (28)	TP26.094x25.988x1.038	24.806	1448.100	0.017	0.811	3177.650	0.000
L29	27.75 - 27.5 (29)	TP26.148x26.094x1.213	24.836	1684.130	0.015	0.812	3677.625	0.000
L30	27.5 - 27.25 (30)	TP26.201x26.148x0.9	24.866	1268.410	0.020	0.814	2810.442	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 $\frac{T_u}{\phi T_n}$
L31	27.25 - 27.08 (31)	TP26.237x26.201x0.9	24.885	1270.230	0.020	0.815	2818.483	0.000
L32	27.08 - 26.83 (32)	TP26.29x26.237x0.738	24.914	1049.740	0.024	0.817	2349.083	0.000
L33	26.83 - 21.83 (33)	TP27.354x26.29x0.725	25.427	1075.430	0.024	0.872	2507.958	0.000
L34	21.83 - 16.83 (34)	TP28.418x27.354x0.7	25.889	1080.810	0.024	0.939	2623.592	0.000
L35	16.83 - 15.45 (35)	TP28.712x28.418x0.7	26.116	1092.260	0.024	0.960	2679.483	0.000
L36	15.45 - 15.2 (36)	TP28.765x28.712x0.488	26.120	767.897	0.034	0.964	1901.633	0.001
L37	15.2 - 13.4 (37)	TP29.148x28.765x0.775	26.314	1224.880	0.021	0.989	3043.583	0.000
L38	13.4 - 13.15 (38)	TP29.201x29.148x0.775	26.316	1227.180	0.021	0.992	3055.008	0.000
L39	13.15 - 8.15 (39)	TP30.266x29.201x0.75	26.805	1233.090	0.022	1.053	3187.333	0.000
L40	8.15 - 6.5 (40)	TP30.617x30.266x0.75	26.974	1247.760	0.022	1.077	3263.625	0.000
L41	6.5 - 6.25 (41)	TP30.67x30.617x0.838	26.976	1391.740	0.019	1.080	3636.017	0.000
L42	6.25 - 4.45 (42)	TP31.053x30.67x0.825	27.177	1389.140	0.020	1.106	3677.358	0.000
L43	4.45 - 4.2 (43)	TP31.106x31.053x0.788	27.173	1329.980	0.020	1.106	3531.300	0.000
L44	4.2 - 0 (44)	TP32x31.106x0.775	27.493	1347.990	0.020	1.106	3686.133	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	98 - 93 (1)	0.008	0.110	0.000	0.043	0.000	0.119 ✔	1.050	4.8.2 ✔
L2	93 - 88 (2)	0.012	0.295	0.000	0.066	0.000	0.311 ✔	1.050	4.8.2 ✔
L3	88 - 82.79 (3)	0.011	0.411	0.000	0.064	0.000	0.426 ✔	1.050	4.8.2 ✔
L4	82.79 - 80.21 (4)	0.009	0.461	0.000	0.047	0.000	0.472 ✔	1.050	4.8.2 ✔
L5	80.21 - 75.21 (5)	0.009	0.559	0.000	0.045	0.000	0.570 ✔	1.050	4.8.2 ✔
L6	75.21 - 70.21 (6)	0.012	0.714	0.000	0.062	0.001	0.730 ✔	1.050	4.8.2 ✔
L7	70.21 - 65.21 (7)	0.015	0.843	0.000	0.082	0.001	0.865 ✔	1.050	4.8.2 ✔
L8	65.21 - 60.21 (8)	0.015	0.982	0.000	0.079	0.001	1.003 ✔	1.050	4.8.2 ✔
L9	60.21 - 59.17 (9)	0.015	1.007	0.000	0.078	0.001	1.028 ✔	1.050	4.8.2 ✔
L10	59.17 - 58.9 (10)	0.008	0.514	0.000	0.038	0.001	0.524 ✔	1.050	4.8.2 ✔
L11	58.9 - 58.75 (11)	0.008	0.516	0.000	0.038	0.001	0.525 ✔	1.050	4.8.2 ✔
L12	58.75 - 54.08	0.008	0.577	0.000	0.038	0.001	0.586	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
	(12)						✔		
L13	54.08 - 53.83 (13)	0.006	0.426	0.000	0.027	0.001	0.433 ✔	1.050	4.8.2 ✔
L14	53.83 - 52.91 (14)	0.006	0.432	0.000	0.027	0.001	0.439 ✔	1.050	4.8.2 ✔
L15	52.91 - 52.66 (15)	0.005	0.396	0.000	0.025	0.001	0.402 ✔	1.050	4.8.2 ✔
L16	52.66 - 52.17 (16)	0.005	0.399	0.000	0.025	0.000	0.405 ✔	1.050	4.8.2 ✔
L17	52.17 - 51.92 (17)	0.006	0.446	0.000	0.028	0.001	0.452 ✔	1.050	4.8.2 ✔
L18	51.92 - 45.29 (18)	0.006	0.481	0.000	0.028	0.000	0.488 ✔	1.050	4.8.2 ✔
L19	45.29 - 44.29 (19)	0.006	0.479	0.000	0.026	0.000	0.486 ✔	1.050	4.8.2 ✔
L20	44.29 - 39.29 (20)	0.006	0.514	0.000	0.026	0.000	0.521 ✔	1.050	4.8.2 ✔
L21	39.29 - 34.29 (21)	0.007	0.547	0.000	0.026	0.000	0.555 ✔	1.050	4.8.2 ✔
L22	34.29 - 33.5 (22)	0.007	0.550	0.000	0.026	0.000	0.557 ✔	1.050	4.8.2 ✔
L23	33.5 - 33.25 (23)	0.005	0.398	0.000	0.018	0.000	0.403 ✔	1.050	4.8.2 ✔
L24	33.25 - 32 (24)	0.005	0.400	0.000	0.018	0.000	0.405 ✔	1.050	4.8.2 ✔
L25	32 - 31.75 (25)	0.006	0.505	0.000	0.023	0.000	0.511 ✔	1.050	4.8.2 ✔
L26	31.75 - 28.5 (26)	0.006	0.519	0.000	0.023	0.000	0.526 ✔	1.050	4.8.2 ✔
L27	28.5 - 28.25 (27)	0.005	0.389	0.000	0.017	0.000	0.394 ✔	1.050	4.8.2 ✔
L28	28.25 - 27.75 (28)	0.005	0.390	0.000	0.017	0.000	0.395 ✔	1.050	4.8.2 ✔
L29	27.75 - 27.5 (29)	0.004	0.341	0.000	0.015	0.000	0.345 ✔	1.050	4.8.2 ✔
L30	27.5 - 27.25 (30)	0.005	0.443	0.000	0.020	0.000	0.449 ✔	1.050	4.8.2 ✔
L31	27.25 - 27.08 (31)	0.005	0.443	0.000	0.020	0.000	0.449 ✔	1.050	4.8.2 ✔
L32	27.08 - 26.83 (32)	0.007	0.531	0.000	0.024	0.000	0.538 ✔	1.050	4.8.2 ✔
L33	26.83 - 21.83 (33)	0.007	0.548	0.000	0.024	0.000	0.555 ✔	1.050	4.8.2 ✔
L34	21.83 - 16.83 (34)	0.007	0.573	0.000	0.024	0.000	0.580 ✔	1.050	4.8.2 ✔
L35	16.83 - 15.45 (35)	0.007	0.574	0.000	0.024	0.000	0.582 ✔	1.050	4.8.2 ✔
L36	15.45 - 15.2 (36)	0.010	0.806	0.000	0.034	0.001	0.818 ✔	1.050	4.8.2 ✔
L37	15.2 - 13.4 (37)	0.007	0.525	0.000	0.021	0.000	0.532 ✔	1.050	4.8.2 ✔
L38	13.4 - 13.15	0.007	0.525	0.000	0.021	0.000	0.532	1.050	4.8.2 ✔

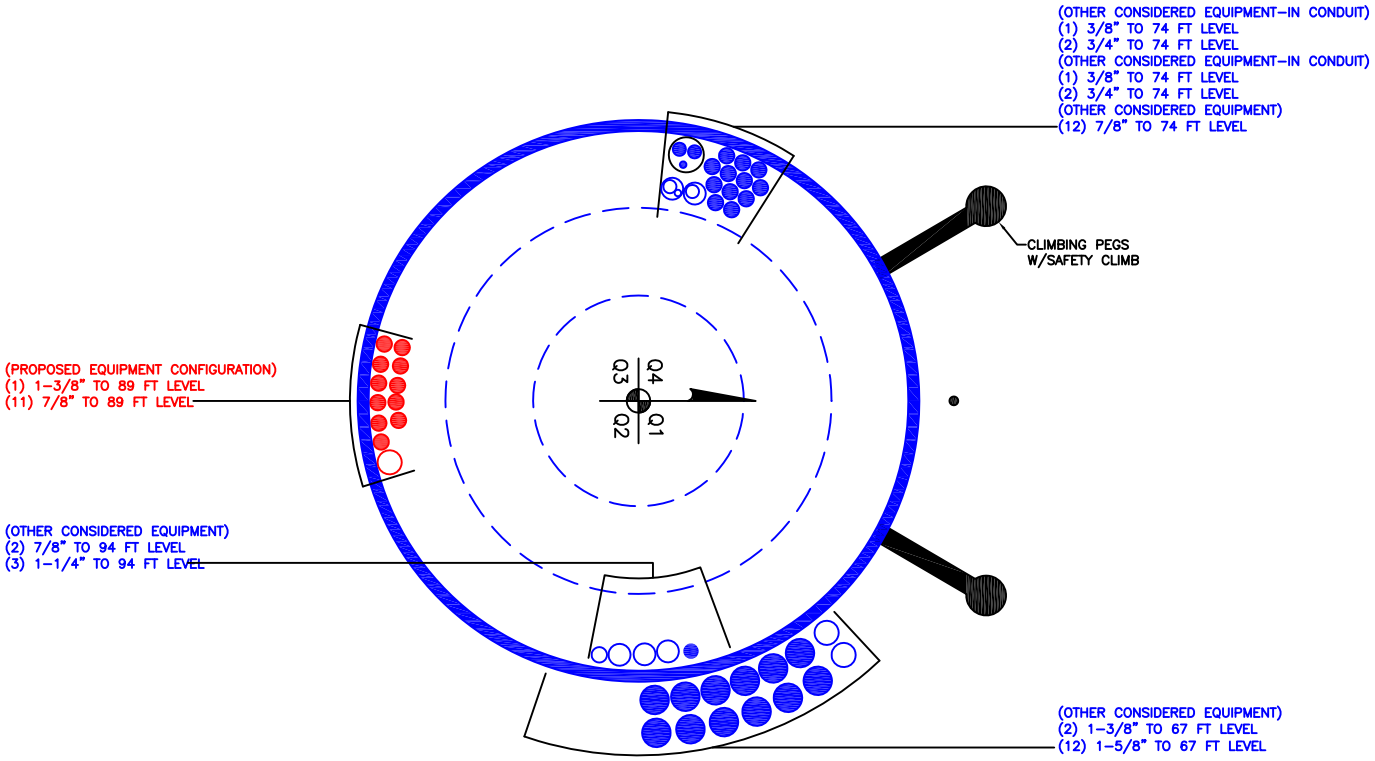
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(38)						✔		
L39	13.15 - 8.15	0.007	0.545	0.000	0.022	0.000	0.552	1.050	4.8.2 ✔
	(39)						✔		
L40	8.15 - 6.5 (40)	0.007	0.546	0.000	0.022	0.000	0.553	1.050	4.8.2 ✔
							✔		
L41	6.5 - 6.25 (41)	0.006	0.493	0.000	0.019	0.000	0.500	1.050	4.8.2 ✔
							✔		
L42	6.25 - 4.45 (42)	0.007	0.501	0.000	0.020	0.000	0.508	1.050	4.8.2 ✔
							✔		
L43	4.45 - 4.2 (43)	0.007	0.523	0.000	0.020	0.000	0.530	1.050	4.8.2 ✔
							✔		
L44	4.2 - 0 (44)	0.007	0.532	0.000	0.020	0.000	0.540	1.050	4.8.2 ✔
							✔		

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	98 - 93	Pole	TP13.078x12x0.188	1	-3.438	471.228	11.1	Pass
L2	93 - 88	Pole	TP14.156x13.078x0.188	2	-5.634	510.643	29.0	Pass
L3	88 - 82.79	Pole	TP15.28x14.156x0.188	3	-5.783	532.638	40.0	Pass
L4	82.79 - 80.21	Pole	TP15.445x14.383x0.25	4	-6.201	740.609	44.6	Pass
L5	80.21 - 75.21	Pole	TP16.507x15.445x0.25	5	-6.587	792.358	53.9	Pass
L6	75.21 - 70.21	Pole	TP17.568x16.507x0.25	6	-9.904	844.108	68.9	Pass
L7	70.21 - 65.21	Pole	TP18.63x17.568x0.25	7	-13.199	895.858	81.5	Pass
L8	65.21 - 60.21	Pole	TP19.692x18.63x0.25	8	-13.968	947.607	94.7	Pass
L9	60.21 - 59.17	Pole	TP19.913x19.692x0.25	9	-14.133	958.371	97.1	Pass
L10	59.17 - 58.9	Pole	TP19.97x19.913x0.513	10	-14.212	1944.159	88.0	Pass
L11	58.9 - 58.75	Pole	TP20.002x19.97x0.513	11	-14.242	1947.340	88.4	Pass
L12	58.75 - 54.08	Pole	TP20.993x20.002x0.5	12	-15.108	1997.730	99.2	Pass
L13	54.08 - 53.83	Pole	TP21.047x20.993x0.7	13	-15.165	2776.777	74.6	Pass
L14	53.83 - 52.91	Pole	TP21.242x21.047x0.7	14	-15.374	2803.437	76.2	Pass
L15	52.91 - 52.66	Pole	TP21.295x21.242x0.775	15	-15.447	3100.492	68.9	Pass
L16	52.66 - 52.17	Pole	TP21.399x21.295x0.775	16	-15.569	3116.221	69.7	Pass
L17	52.17 - 51.92	Pole	TP21.452x21.399x0.688	17	-15.711	2783.235	76.5	Pass
L18	51.92 - 45.29	Pole	TP22.86x21.452x0.663	18	-16.474	2773.291	81.5	Pass
L19	45.29 - 44.29	Pole	TP22.574x21.634x0.738	19	-18.203	3139.825	84.1	Pass
L20	44.29 - 39.29	Pole	TP23.638x22.574x0.713	20	-19.534	3184.671	90.1	Pass
L21	39.29 - 34.29	Pole	TP24.703x23.638x0.688	21	-20.898	3218.911	95.4	Pass
L22	34.29 - 33.5	Pole	TP24.871x24.703x0.688	22	-21.120	3241.444	96.1	Pass
L23	33.5 - 33.25	Pole	TP24.924x24.871x0.988	23	-21.216	4608.376	68.7	Pass
L24	33.25 - 32	Pole	TP25.19x24.924x0.988	24	-21.633	4659.595	69.7	Pass
L25	32 - 31.75	Pole	TP25.243x25.19x0.763	25	-21.718	3639.268	82.5	Pass
L26	31.75 - 28.5	Pole	TP25.935x25.243x0.75	26	-22.668	3682.570	85.2	Pass
L27	28.5 - 28.25	Pole	TP25.988x25.935x1.038	27	-22.773	5046.835	63.8	Pass
L28	28.25 - 27.75	Pole	TP26.094x25.988x1.038	28	-22.953	5068.360	64.2	Pass
L29	27.75 - 27.5	Pole	TP26.148x26.094x1.213	29	-23.054	5894.469	61.0	Pass
L30	27.5 - 27.25	Pole	TP26.201x26.148x0.9	30	-23.135	4439.442	80.4	Pass
L31	27.25 - 27.08	Pole	TP26.237x26.201x0.9	31	-23.192	4445.794	80.6	Pass
L32	27.08 - 26.83	Pole	TP26.29x26.237x0.738	32	-23.262	3674.097	86.5	Pass
L33	26.83 - 21.83	Pole	TP27.354x26.29x0.725	33	-24.699	3763.998	89.8	Pass
L34	21.83 - 16.83	Pole	TP28.418x27.354x0.7	34	-26.177	3782.835	92.8	Pass
L35	16.83 - 15.45	Pole	TP28.712x28.418x0.7	35	-26.584	3822.913	93.6	Pass
L36	15.45 - 15.2	Pole	TP28.765x28.712x0.488	36	-26.684	2687.643	88.4	Pass
L37	15.2 - 13.4	Pole	TP29.148x28.765x0.775	37	-27.279	4287.097	86.5	Pass
L38	13.4 - 13.15	Pole	TP29.201x29.148x0.775	38	-27.387	4295.140	86.7	Pass
L39	13.15 - 8.15	Pole	TP30.266x29.201x0.75	39	-29.097	4315.825	89.3	Pass
L40	8.15 - 6.5	Pole	TP30.617x30.266x0.75	40	-29.664	4367.170	90.1	Pass
L41	6.5 - 6.25	Pole	TP30.67x30.617x0.838	41	-29.777	4871.076	87.0	Pass
L42	6.25 - 4.45	Pole	TP31.053x30.67x0.825	42	-30.427	4862.004	87.9	Pass
L43	4.45 - 4.2	Pole	TP31.106x31.053x0.788	43	-30.536	4654.923	92.0	Pass
L44	4.2 - 0	Pole	TP32x31.106x0.775	44	-32.003	4717.986	93.9	Pass
							Summary	
						Pole (L9)	99.2	Pass
						RATING =	**99.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876399

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876399

Work Order: 1663795

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	98	15.21	2.42	18	12	15.28	0.1875	Auto	A572-65
2	85.21	39.92	3.42	18	14.38	22.86	0.25	Auto	A572-65
3	48.71	48.71	0	18	21.63	32	0.3125	Auto	A572-65

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	0	6.5	plate	MS-600 W(1.1875")	1												E1						
2	0	28.5	plate	MS-600 W(1.1875")	1																		E1
3	0	28.5	plate	MS-600 (1.1875")	1						E1												
4	4.45	15.45	plate	MS-600 (1.1875")	1											E1							
5	13.41	28.5	plate	MS-600 (1.1875")	1												E1						
6	27.5	33.5	plate	MS-600 (1.1875")	3					E1						E1						E1	
7	32	48.25	plate	MS-450 (1.1875")	1												E1						
8	32	59	plate	MS-450 (1.1875")	2						E1												E1
9	47.41	52.91	plate	MS-450 (1.1875")	1											E1							
10	52.17	59.17	plate	MS-450 (1.1875")	1												E1						
11	0	27.75	plate	CCI-SFP-065125	2		P													P			
12	27.08	54.08	plate	CCI-SFP-045100	1								P										
13	27.75	54.08	plate	CCI-SFP-045100	2		P													P			
14	0	13.5	plate	CCI-SFP-045100	1							P											
15																							

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	6	1	6	0.5	n/a	24.000	16.375	4.750	1.1875	A572-65
2	6	1	6	0.5	n/a	24.000	16.375	4.750	1.1875	A572-65
3	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
5	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
6	6	1	6	0.5	24.000	24.000	16.375	4.750	1.1875	A572-65
7	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
8	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
9	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
10	4.5	1	4.5	0.5	18.000	18.000	20.625	3.250	1.1875	A572-65
11	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
12	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
13	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
14	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65

TNX Geometry Input

Increment (ft): 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	98 - 93	5		18	12.000	13.078	0.1875	A572-65	1.000
2	93 - 88	5		18	13.078	14.156	0.1875	A572-65	1.000
3	88 - 85.21	5.21	2.42	18	14.156	15.280	0.1875	A572-65	1.000
4	85.21 - 80.21	5		18	14.383	15.445	0.25	A572-65	1.000
5	80.21 - 75.21	5		18	15.445	16.507	0.25	A572-65	1.000
6	75.21 - 70.21	5		18	16.507	17.568	0.25	A572-65	1.000
7	70.21 - 65.21	5		18	17.568	18.630	0.25	A572-65	1.000
8	65.21 - 60.21	5		18	18.630	19.692	0.25	A572-65	1.000
9	60.21 - 59.17	1.04		18	19.692	19.913	0.25	A572-65	1.000
10	59.17 - 58.9	0.27		18	19.913	19.970	0.5125	A572-65	0.921
11	58.9 - 58.75	0.15		18	19.970	20.002	0.5125	A572-65	0.920
12	58.75 - 54.08	4.67		18	20.002	20.993	0.5	A572-65	0.921
13	54.08 - 53.83	0.25		18	20.993	21.047	0.7	A572-65	0.962
14	53.83 - 52.91	0.92		18	21.047	21.242	0.7	A572-65	0.957
15	52.91 - 52.66	0.25		18	21.242	21.295	0.775	A572-65	0.955
16	52.66 - 52.17	0.49		18	21.295	21.399	0.775	A572-65	0.952
17	52.17 - 51.92	0.25		18	21.399	21.452	0.6875	A572-65	0.967
18	51.92 - 48.71	6.63	3.42	18	21.452	22.860	0.6625	A572-65	0.983
19	48.71 - 44.29	4.42		18	21.634	22.574	0.7375	A572-65	0.960
20	44.29 - 39.29	5		18	22.574	23.638	0.7125	A572-65	0.967
21	39.29 - 34.29	5		18	23.638	24.703	0.6875	A572-65	0.977
22	34.29 - 33.5	0.79		18	24.703	24.871	0.6875	A572-65	0.973
23	33.5 - 33.25	0.25		18	24.871	24.924	0.9875	A572-65	0.925
24	33.25 - 32	1.25		18	24.924	25.190	0.9875	A572-65	0.919
25	32 - 31.75	0.25		18	25.190	25.243	0.7625	A572-65	0.949
26	31.75 - 28.5	3.25		18	25.243	25.935	0.75	A572-65	0.949
27	28.5 - 28.25	0.25		18	25.935	25.988	1.0375	A572-65	0.912
28	28.25 - 27.75	0.5		18	25.988	26.094	1.0375	A572-65	0.910
29	27.75 - 27.5	0.25		18	26.094	26.148	1.2125	A572-65	0.858
30	27.5 - 27.25	0.25		18	26.148	26.201	0.9	A572-65	0.891
31	27.25 - 27.08	0.17		18	26.201	26.237	0.9	A572-65	0.891
32	27.08 - 26.83	0.25		18	26.237	26.290	0.7375	A572-65	0.903
33	26.83 - 21.83	5		18	26.290	27.354	0.725	A572-65	0.899
34	21.83 - 16.83	5		18	27.354	28.418	0.7	A572-65	0.911
35	16.83 - 15.45	1.38		18	28.418	28.712	0.7	A572-65	0.907
36	15.45 - 15.2	0.25		18	28.712	28.765	0.4875	A572-65	1.428
37	15.2 - 13.4	1.8		18	28.765	29.148	0.775	A572-65	0.965
38	13.4 - 13.15	0.25		18	29.148	29.201	0.775	A572-65	0.964
39	13.15 - 8.15	5		18	29.201	30.266	0.75	A572-65	0.974
40	8.15 - 6.5	1.65		18	30.266	30.617	0.75	A572-65	0.968
41	6.5 - 6.25	0.25		18	30.617	30.670	0.8375	A572-65	0.944
42	6.25 - 4.45	1.8		18	30.670	31.053	0.825	A572-65	0.951
43	4.45 - 4.2	0.25		18	31.053	31.106	0.7875	A572-65	0.914
44	4.2 - 0	4.2		18	31.106	32.000	0.775	A572-65	0.914

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	98 - 93	3.44	16.50	5.83
2	93 - 88	5.63	52.00	9.59
3	88 - 85.21	5.78	78.90	9.70
4	85.21 - 80.21	6.20	127.92	9.91
5	80.21 - 75.21	6.59	177.92	10.10
6	75.21 - 70.21	9.90	257.88	14.99
7	70.21 - 65.21	13.21	343.24	20.69
8	65.21 - 60.21	13.97	447.56	21.06
9	60.21 - 59.17	14.13	469.49	21.14
10	59.17 - 58.9	14.21	475.20	21.15
11	58.9 - 58.75	14.24	478.37	21.16
12	58.75 - 54.08	15.09	578.05	21.65
13	54.08 - 53.83	15.17	583.47	21.67
14	53.83 - 52.91	15.37	603.45	21.79
15	52.91 - 52.66	15.45	608.90	21.81
16	52.66 - 52.17	15.57	619.60	21.88
17	52.17 - 51.92	15.71	625.09	21.98
18	51.92 - 48.71	16.47	696.25	22.37
19	48.71 - 44.29	18.20	796.42	22.96
20	44.29 - 39.29	19.53	912.53	23.51
21	39.29 - 34.29	20.90	1031.37	24.05
22	34.29 - 33.5	21.12	1050.40	24.14
23	33.5 - 33.25	21.22	1056.44	24.16
24	33.25 - 32	21.63	1086.73	24.32
25	32 - 31.75	21.72	1092.81	24.34
26	31.75 - 28.5	22.67	1172.51	24.72
27	28.5 - 28.25	22.77	1178.69	24.74
28	28.25 - 27.75	22.95	1191.08	24.81
29	27.75 - 27.5	23.05	1197.28	24.84
30	27.5 - 27.25	23.14	1203.49	24.87
31	27.25 - 27.08	23.19	1207.72	24.89
32	27.08 - 26.83	23.26	1213.95	24.91
33	26.83 - 21.83	24.70	1339.74	25.43
34	21.83 - 16.83	26.18	1467.95	25.89
35	16.83 - 15.45	26.58	1503.76	26.12
36	15.45 - 15.2	26.68	1510.28	26.12
37	15.2 - 13.4	27.28	1557.45	26.31
38	13.4 - 13.15	27.39	1564.02	26.32
39	13.15 - 8.15	29.10	1696.77	26.80
40	8.15 - 6.5	29.66	1741.11	26.97
41	6.5 - 6.25	29.78	1747.85	26.98
42	6.25 - 4.45	30.43	1796.56	27.18
43	4.45 - 4.2	30.54	1803.35	27.17
44	4.2 - 0	32.00	1918.10	27.49

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
98 - 93	Pole	TP13.078x12x0.1875	Pole	11.1%	Pass
93 - 88	Pole	TP14.156x13.078x0.1875	Pole	29.0%	Pass
88 - 85.21	Pole	TP15.28x14.156x0.1875	Pole	40.0%	Pass
85.21 - 80.21	Pole	TP15.445x14.383x0.25	Pole	44.6%	Pass
80.21 - 75.21	Pole	TP16.507x15.445x0.25	Pole	53.9%	Pass
75.21 - 70.21	Pole	TP17.568x16.507x0.25	Pole	68.9%	Pass
70.21 - 65.21	Pole	TP18.63x17.568x0.25	Pole	81.5%	Pass
65.21 - 60.21	Pole	TP19.692x18.63x0.25	Pole	94.7%	Pass
60.21 - 59.17	Pole	TP19.913x19.692x0.25	Pole	97.1%	Pass
59.17 - 58.9	Pole + Reinf.	TP19.97x19.913x0.5125	Reinf. 10 Compression	88.0%	Pass
58.9 - 58.75	Pole + Reinf.	TP20.002x19.97x0.5125	Reinf. 10 Compression	88.4%	Pass
58.75 - 54.08	Pole + Reinf.	TP20.993x20.002x0.5	Reinf. 10 Compression	99.2%	Pass
54.08 - 53.83	Pole + Reinf.	TP21.047x20.993x0.7	Reinf. 10 Compression	74.6%	Pass
53.83 - 52.91	Pole + Reinf.	TP21.242x21.047x0.7	Reinf. 10 Compression	76.2%	Pass
52.91 - 52.66	Pole + Reinf.	TP21.295x21.242x0.775	Reinf. 8 Compression	68.9%	Pass
52.66 - 52.17	Pole + Reinf.	TP21.399x21.295x0.775	Reinf. 8 Compression	69.7%	Pass
52.17 - 51.92	Pole + Reinf.	TP21.452x21.399x0.6875	Reinf. 9 Compression	76.5%	Pass
51.92 - 48.71	Pole + Reinf.	TP22.86x21.452x0.6625	Reinf. 9 Compression	81.5%	Pass
48.71 - 44.29	Pole + Reinf.	TP22.574x21.634x0.7375	Reinf. 7 Compression	84.1%	Pass
44.29 - 39.29	Pole + Reinf.	TP23.638x22.574x0.7125	Reinf. 7 Compression	90.1%	Pass
39.29 - 34.29	Pole + Reinf.	TP24.703x23.638x0.6875	Reinf. 7 Compression	95.4%	Pass
34.29 - 33.5	Pole + Reinf.	TP24.871x24.703x0.6875	Reinf. 7 Compression	96.1%	Pass
33.5 - 33.25	Pole + Reinf.	TP24.924x24.871x0.9875	Reinf. 7 Compression	68.7%	Pass
33.25 - 32	Pole + Reinf.	TP25.19x24.924x0.9875	Reinf. 7 Compression	69.7%	Pass
32 - 31.75	Pole + Reinf.	TP25.243x25.19x0.7625	Reinf. 13 Tension Rupture	82.5%	Pass
31.75 - 28.5	Pole + Reinf.	TP25.935x25.243x0.75	Reinf. 13 Tension Rupture	85.2%	Pass
28.5 - 28.25	Pole + Reinf.	TP25.988x25.935x1.0375	Reinf. 13 Tension Rupture	63.8%	Pass
28.25 - 27.75	Pole + Reinf.	TP26.094x25.988x1.0375	Reinf. 13 Tension Rupture	64.2%	Pass
27.75 - 27.5	Pole + Reinf.	TP26.148x26.094x1.2125	Reinf. 12 Tension Rupture	61.0%	Pass
27.5 - 27.25	Pole + Reinf.	TP26.201x26.148x0.9	Reinf. 12 Tension Rupture	80.4%	Pass
27.25 - 27.08	Pole + Reinf.	TP26.237x26.201x0.9	Reinf. 12 Tension Rupture	80.6%	Pass
27.08 - 26.83	Pole + Reinf.	TP26.29x26.237x0.7375	Reinf. 3 Tension Rupture	86.5%	Pass
26.83 - 21.83	Pole + Reinf.	TP27.354x26.29x0.725	Reinf. 3 Tension Rupture	89.8%	Pass
21.83 - 16.83	Pole + Reinf.	TP28.418x27.354x0.7	Reinf. 3 Tension Rupture	92.8%	Pass
16.83 - 15.45	Pole + Reinf.	TP28.712x28.418x0.7	Reinf. 3 Tension Rupture	93.6%	Pass
15.45 - 15.2	Pole + Reinf.	TP28.765x28.712x0.4875	Pole	88.4%	Pass
15.2 - 13.4	Pole + Reinf.	TP29.148x28.765x0.775	Reinf. 4 Tension Rupture	86.5%	Pass
13.4 - 13.15	Pole + Reinf.	TP29.201x29.148x0.775	Reinf. 4 Tension Rupture	86.7%	Pass
13.15 - 8.15	Pole + Reinf.	TP30.266x29.201x0.75	Reinf. 4 Tension Rupture	89.3%	Pass
8.15 - 6.5	Pole + Reinf.	TP30.617x30.266x0.75	Reinf. 4 Tension Rupture	90.1%	Pass
6.5 - 6.25	Pole + Reinf.	TP30.67x30.617x0.8375	Reinf. 14 Tension Rupture	87.0%	Pass
6.25 - 4.45	Pole + Reinf.	TP31.053x30.67x0.825	Reinf. 14 Tension Rupture	87.9%	Pass
4.45 - 4.2	Pole + Reinf.	TP31.106x31.053x0.7875	Reinf. 14 Tension Rupture	92.0%	Pass
4.2 - 0	Pole + Reinf.	TP32x31.106x0.775	Reinf. 14 Tension Rupture	93.9%	Pass
				Summary	
			Pole	97.1%	Pass
			Reinforcement	99.2%	Pass
			Overall	99.2%	Pass

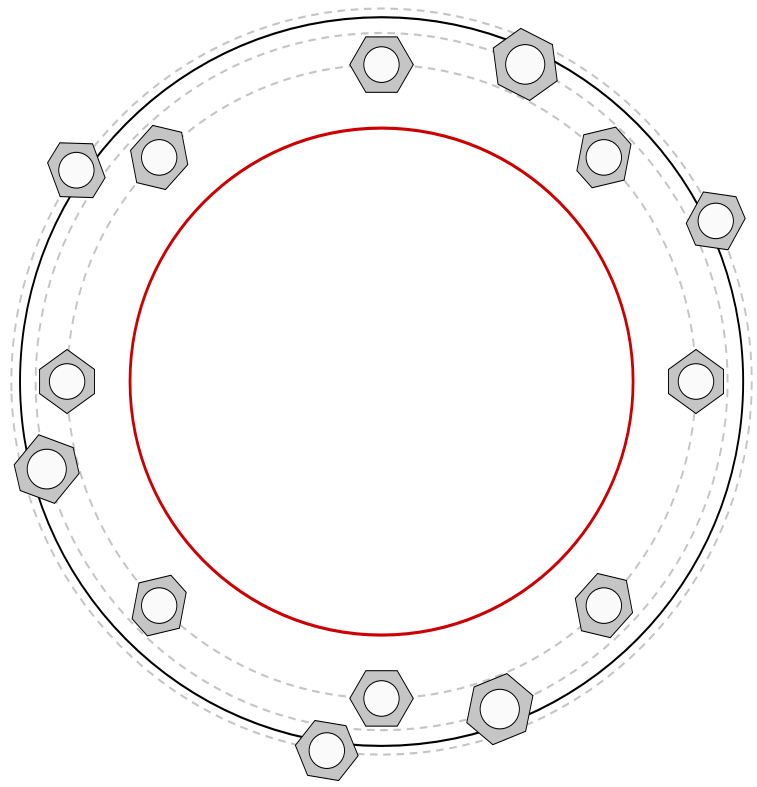
Monopole Base Plate Connection

Site Info	
BU #	812252
Site Name	TIN DOWNTOWN NASC
Order #	447661, Rev. 0

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

Applied Loads	
Moment (kip-ft)	1918.10
Axial Force (kips)	32.00
Shear Force (kips)	27.49

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 40" BC

GROUP 2: (3) 2-1/2" ø bolts (William N; Fy=120 ksi, Fu=125 ksi) on 44" BC

pos. (deg): 65.4, 194.6, 290

GROUP 3: (3) 2-1/4" ø bolts (A193 Gr. B7 N; Fy=105 ksi, Fu=125 ksi) on 47.1" BC

pos. (deg): 25.5, 145.5, 261.5

Base Plate Data

46" OD x 1.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

32" x 0.775" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

GROUP 1:		
Pu_c = 144.63	ϕPn_c = 243.75	**Stress Rating**
Vu = 3.44	ϕVn = 73.13	**56.7%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_c = 227.34	ϕPn_c = 622.8	**Stress Rating**
Vu = 0	ϕVn = 186.84	**34.8%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 3:		
Pu_c = 164.77	ϕPn_c = 341.25	**Stress Rating**
Vu = 0	ϕVn = 102.38	**46.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	49.83	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**87.9%**	**Pass**

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	1	OF	5

V1.1.1

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Additional Anchor Rods: Division of Forces

Rev. H

Base Reactions from tnxTower:

Apply TIA-222-H Section 15.5? Yes

Moment	1918.0	kip-ft
Axial	32.0	kip
Shear	27.0	kip

Existing Anchor Rod Group Moment of Inertia

Number of rods, Nexisting	8	
Diameter of rods, Dexisting	2 1/4	in
Bolt Circle, BCexisting	40	in
Net Area, Anetexisting	3.25	in^2
Iexisting	5200	in^4

Additonal (New) Anchor Rod Group Moment of Inertia

Number of rods, Nnew	3	
Diameter of rods, Dnew	2 1/2	in
Fyrod	127	ksi
Furod	150	ksi
Bolt Circle, BCnew	47.1	in
Net Area, Anew	4.0	in^2
Inew	3328	in^4

Division of Forces

Itotal	8528	in^4
Percentage_existing	61%	
Percentage_new	39%	

Forces Remaining in Existing Anchor Rods

Mexisting	1169.6	kip-ft
Axexisting	32.0	kip
Sexisting	27.0	kip

Forces to New Anchor Rods

Mnew	748.4	kip-ft
Axnew	0	kip
Snew	0	kip

(It is assumed that all of the Axial and Shear loads will go to the existing anchor rods)

[See attached Flange tool output for additional anchor rod group capacity and structural rating values]

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	2	OF	5

V1.1.1

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Anchor Rod Bracket Calculations

(Design the anchor rod bracket and all components to resist the full capacity of the additional anchors)

Bracket Design Load (Anchor Tensile/Compression Capacity):(TIA-222-H, Section 4.9.9)

ϕPnc	508	kip		
ϕPnt	450.0	kip	Check Bracket for Anchor Rod:	Expected Load
ϕPn	508	kip		
Expected Load	227.34	kip		

Tube Design (Square HSS)

Member Size	5 XXS Pipe	

Member Properties
(AISC 15th Ed., Table 1-12)

Outside Diameter (ODHSS)	5.56	in
Area (AHSS)	11.34036408	in^2
(AeHSS)	8.51	in^2
Thickness (tHSS)	0.750	in
FyHSS	50	ksi
FuHSS	65	ksi
Length (LHSS)	18.0	in
Moment of Inertia (IHSS)	33.63476715	in^4
Radius of Gyration (rHSS)	1.722188615	in
Inside Dimension (IDHSS)	4.06	in
Extension of Tube Above Gusset	0	in

Bearing Check
(AISC 15th Ed., Equation J7-1)

ϕb	0.75		
Apb	3.37	in^2	
Check_bear	**OK**		0.30

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4)

ϕc	0.9	
K	1.0	
Lc	18.0	in
Fe	2620.1	ksi
Fcr	49.6	ksi
ϕPn_comp	510.3	kips
(AISC 15th Ed., Equation J4-6)		
Checkcomp	**OK**	0.45

Gusset Plate Design

Gusset Plate width (wplate)	5.5	in
Gusset Plate thickness (tplate)	1.25	in
Lplate1	48	in
Lplate2	24	in
Gusset Plate Strength:		
Fyplate	65	ksi
Fuplate	80	ksi
Pole thickness (tpole)	0.3125	in
Load Angle	45	degrees

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Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4)

Ag	30.0	in^2
Anv	30.0	in^2

Shear Yielding

ϕv	1.0	
ϕVplate	1170	kip
Checkshear	**OK**	0.19

Shear Rupture

ϕv	0.75	
ϕVplate	1080	kip
Checkshear	**OK**	0.21

Gusset Plate to Pole and Base Plate
Weld Design (Horizontal and Vertical Weld)
(AISC 15th Ed., Part 8)

Gusset plate thickness (tplate)	1.25	in
Pole Grade		
Fypole	65	ksi
Fupole	80	ksi
Base Plate Grade		
Fybase	60	
Fubase	75	
Gussett Plate Grade		
Fyplate	65	ksi
Fuplate	80	ksi
Height of vertical weld from base plate (H)	48	in
Notch	0.75	in
Gap between Base Plate and HSS	0	in
Vertical fillet weld size to pole (Dvpole)	6	(in sixteenths of an inch)
weldsizepole	3/8	
Weld Material Grade (FEXX)	70	ksi
Checkweld	**OK**	0.781

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Gusset Plate to HSS Weld Design (AISC 15th Ed., Table 8-4)

Electrode Strength (FEXX)	70	ksi
Weld Size (in sixteenths of an inch) (D1)	6	in
weldsize1	3/8	in

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.563	in
Load not in plane with weld group, k	0	
a	0.148	in
C1	1.00	
Coeff1	3.71	
ϕw	0.75	
Dmin1	4	(in sixteenths of an inch)
minweldsize	1/4	in
checkweld	OK	
ϕRnweld1	400.68	kip
Checkweld1	**OK**	0.57

Gusset Plate to Pole Punching Shear Check (max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ϕsy	1.0		
ϕsr	0.75		
ecc1	9.063	in	
M1	2060	kip-in	
S1	480	in^3	
fv	5.37	kip/in	
ϕFsy	24.38	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	22.50	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	22.50	kip/in	
Check.PS1	**OK**	0.24	

Gusset Plate to HSS Punching Shear Check(max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.563	in	
M2	810.0	kip-in	
S2	120	in^3	
fv	8.44	kip/in	
ϕFsy	45.00	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	43.88	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	43.88	kip/in	
CheckPS2	**OK**	0.19	

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	5	OF	5

V1.1.1

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Embedment Depth Calculations

Projected Embedment Depth (Lem)	5	ft	
Yield Strength of Rebar (fy)	60	ksi	
Concrete Strength (f'c)	3000	psi	
Transverse Reinforcement Index (ktr)	0		(Can be taken as 0 for design per ACI 318-14)
Epoxy Factor (ψe)	1		
Rebar Size Factor (ψs)	1		
Casting Position Factor(ψt)	1		
Concrete Weight Factor (λ)	1	√psi	
Pier Diameter (Dpier)	5.0	ft	
Cover (Cc)	3	in	
Rebar Size (ds)	8		
db	1	in	
Tie Size (Tie)	4		
Ts	0.5	in	
Number of vertical rebars (n)	20		

Development Length (ACI 318-14 Chapter 25)

BCrebar	52.0	in	
Srebar	8.2	in	
cb	4.0	in	
ld	32.9	in	**(ACI 318-14, Equation 25.4.2.3a)**

Calculate Max Distance Between Rebar and New Anchor Rods

A	4.1	in	
B	2.5	in	
G	4.8	in	
l'd	3.25	ft	

AF35LVE

#N/A

No

281

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	1	OF	5

V1.1.1

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Additional Anchor Rods: Division of Forces

Rev. H

Base Reactions from tnxTower:

Apply TIA-222-H Section 15.5? Yes

Moment	1918.0	kip-ft
Axial	32.0	kip
Shear	27.5	kip

Existing Anchor Rod Group Moment of Inertia

Number of rods, Nexisting	8	
Diameter of rods, Dexisting	2 1/4	in
Bolt Circle, BCexisting	40	in
Net Area, Anetexisting	3.25	in^2
Iexisting	5200	in^4

Additonal (New) Anchor Rod Group Moment of Inertia

Number of rods, Nnew	3	
Diameter of rods, Dnew	2 1/4	in
Fyrod	105	ksi
Furod	125	ksi
Bolt Circle, BCnew	47.0	in
Net Area, Anew	3.3	in^2
Inew	2692	in^4

Division of Forces

Itotal	7892	in^4
Percentage_existing	66%	
Percentage_new	34%	

Forces Remaining in Existing Anchor Rods

Mexisting	1263.7	kip-ft
Axexisting	32.0	kip
Sexisting	27.5	kip

Forces to New Anchor Rods

Mnew	654.3	kip-ft
Axnew	0	kip
Snew	0	kip

(It is assumed that all of the Axial and Shear loads will go to the existing anchor rods)

[See attached Flange tool output for additional anchor rod group capacity and structural rating values]

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	2	OF	5

V1.1.1

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Anchor Rod Bracket Calculations

(Design the anchor rod bracket and all components to resist the full capacity of the additional anchors)

Bracket Design Load (Anchor Tensile/Compression Capacity):(TIA-222-H, Section 4.9.9)

ϕPnc	341.25	kip		
ϕPnt	304.7	kip	Check Bracket for Anchor Rod:	Capacity
ϕPn	341.25	kip		
Expected Load	341.25	kip		

Tube Design (Square HSS)

Member Size	HSS5x5x1/2

Member Properties
(AISC 15th Ed., Table 1-12)

Outside Diameter (ODHSS)	5.00	in
Area (AHSS)	7.88	in^2
(AeHSS)	5.91	in^2
Thickness (tHSS)	0.500	in
FyHSS	50	ksi
FuHSS	65	ksi
Length (LHSS)	27.0	in
Moment of Inertia (IHSS)	26	in^4
Radius of Gyration (rHSS)	1.82	in
Inside Dimension (IDHSS)	4.00	in
Extension of Tube Above Gusset	0	in

Bearing Check
(AISC 15th Ed., Equation J7-1)

ϕb	0.75	
Apb	5.06	in^2
Check_bear	**OK**	0.64

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4)

ϕc	0.9	
K	1.0	
Lc	27.0	in
Fe	1300.5	ksi
Fcr	49.2	ksi
ϕPn_comp	354.6	kips
(AISC 15th Ed., Equation J4-6)		
Checkcomp	**OK**	0.96

Gusset Plate Design

Gusset Plate width (wplate)	5.5	in
Gusset Plate thickness (tplate)	1.25	in
Lplate1	48	in
Lplate2	24	in
Gusset Plate Strength:		
Fyplate	65	ksi
Fuplate	80	ksi
Pole thickness (tpole)	0.3125	in
Load Angle	45	degrees

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Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4)

Ag	30.0	in^2
Anv	30.0	in^2

Shear Yielding

ϕv	1.0	
ϕVplate	1170	kip
Checkshear	**OK**	0.29

Shear Rupture

ϕv	0.75	
ϕVplate	1080	kip
Checkshear	**OK**	0.32

Gusset Plate to Pole and Base Plate
Weld Design (Horizontal and Vertical Weld)
(AISC 15th Ed., Part 8)

Gusset plate thickness (tplate)	1.25	in
Pole Grade		
Fypole	65	ksi
Fupole	80	ksi
Base Plate Grade		
Fybase	60	
Fubase	75	
Gussett Plate Grade		
Fyplate	65	ksi
Fuplate	80	ksi
Height of vertical weld from base plate (H)	48	in
Notch	0.75	in
Gap between Base Plate and HSS	0	in
Vertical fillet weld size to pole (Dvpole)	6	(in sixteenths of an inch)
weldsizepole	3/8	
Weld Material Grade (FEXX)	70	ksi
Checkweld	**OK**	0.741

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Gusset Plate to HSS Weld Design (AISC 15th Ed., Table 8-4)

Electrode Strength (FEXX)	70	ksi
Weld Size (in sixteenths of an inch) (D1)	6	in
weldsize1	3/8	in

(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.375	in
Load not in plane with weld group, k	0	
a	0.141	in
C1	1.00	
Coeff1	3.71	
ϕw	0.75	
Dmin1	6	(in sixteenths of an inch)
minweldsize	3/8	in
checkweld	OK	
ϕRnweld1	400.68	kip
Checkweld1	**OK**	0.85

Gusset Plate to Pole Punching Shear Check (max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ϕsy	1.0		
ϕsr	0.75		
ecc1	8.875	in	
M1	3029	kip-in	
S1	480	in^3	
fv	7.89	kip/in	
ϕFsy	24.38	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	22.50	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	22.50	kip/in	
Check.PS1	**OK**	0.35	

Gusset Plate to HSS Punching Shear Check(max per unit length)
(AISC 15th Ed., Section J4.2)
(Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS)

ecc2	3.375	in	
M2	1151.7	kip-in	
S2	120	in^3	
fv	12.00	kip/in	
ϕFsy	30.00	kip/in	**(AISC 15th Ed., Equation J4-3)**
ϕFsr	29.25	kip/in	**(AISC 15th Ed., Equation J4-4)**
ϕFv	29.25	kip/in	
CheckPS2	**OK**	0.41	

PROJECT	**87613.012.01 - GALLATIN DOWNT Intiti**				
SUBJECT	**Anchor Rod and Anchor Rod Bracket**				
DATE	**01/17/19**	PAGE	5	OF	5

V1.1.1

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Embedment Depth Calculations

Projected Embedment Depth (Lem)	5	ft	
Yield Strength of Rebar (fy)	60	ksi	
Concrete Strength (f'c)	3000	psi	
Transverse Reinforcement Index (ktr)	0		(Can be taken as 0 for design per ACI 318-14)
Epoxy Factor (ψe)	1		
Rebar Size Factor (ψs)	1		
Casting Position Factor(ψt)	1		
Concrete Weight Factor (λ)	1	√psi	
Pier Diameter (Dpier)	5.0	ft	
Cover (Cc)	3	in	
Rebar Size (ds)	8		
db	1	in	
Tie Size (Tie)	4		
Ts	0.5	in	
Number of vertical rebars (n)	20		

Development Length (ACI 318-14 Chapter 25)

BCrebar	52.0	in	
Srebar	8.2	in	
cb	4.0	in	
ld	32.9	in	**(ACI 318-14, Equation 25.4.2.3a)**

Calculate Max Distance Between Rebar and New Anchor Rods

A	4.1	in	
B	2.5	in	
G	4.8	in	
l'd	3.25	ft	

Epoxy Development Length

Bond Strength			
Epoxy	AF35LVE		
ϕbond	0.65		
sb	1717	psi	
Lbe	43.3	in	

Required Embedment Length

Lmin	5.0	ft	
Check embedment	**OK**		

Anchor Rod Pullout Test

ϕp	0.75		
Is this a CA DSA site?	No		
Pullout	**190**	kip	

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*													
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
98 - 93	161	n/a	161	7.67	n/a	7.67	11.1%														
93 - 88	205	n/a	205	8.31	n/a	8.31	29.0%														
88 - 85.21	233	n/a	233	8.67	n/a	8.67	40.0%														
85.21 - 80.21	352	n/a	352	12.06	n/a	12.06	44.6%														
80.21 - 75.21	431	n/a	431	12.90	n/a	12.90	53.9%														
75.21 - 70.21	521	n/a	521	13.74	n/a	13.74	68.9%														
70.21 - 65.21	622	n/a	622	14.58	n/a	14.58	81.5%														
65.21 - 60.21	736	n/a	736	15.43	n/a	15.43	94.7%														
60.21 - 59.17	762	n/a	762	15.60	n/a	15.60	97.1%														
59.17 - 58.9	769	754	1523	15.65	13.50	29.15	48.8%								88.0%		88.0%				
58.9 - 58.75	772	756	1529	15.67	13.50	29.17	49.0%								88.4%		88.4%				
58.75 - 54.08	895	828	1723	16.46	13.50	29.96	55.0%								99.2%		99.2%				
54.08 - 53.83	903	1477	2380	16.50	27.00	43.50	41.5%								66.6%		74.6%		64.2%	68.2%	
53.83 - 52.91	929	1503	2431	16.66	27.00	43.66	42.3%								68.0%		76.2%		65.6%	69.7%	
52.91 - 52.66	936	1773	2709	16.70	31.50	48.20	38.9%								68.9%	56.4%	59.3%		60.8%	64.9%	
52.66 - 52.17	950	1789	2739	16.78	31.50	48.28	39.3%								69.7%	57.0%	60.0%		61.5%	65.6%	
52.17 - 51.92	957	1504	2461	16.82	27.00	43.82	44.4%								71.7%	76.5%			62.2%	75.7%	
51.92 - 48.71	1053	1595	2648	17.36	27.00	44.36	47.4%								76.6%	81.5%			66.5%	80.7%	
48.71 - 44.29	1384	1686	3069	22.08	27.00	49.08	46.8%							84.1%	76.0%				73.5%	77.5%	
44.29 - 39.29	1592	1839	3431	23.14	27.00	50.14	50.2%							90.1%	81.5%				78.8%	83.1%	
39.29 - 34.29	1820	1999	3819	24.19	27.00	51.19	53.3%							95.4%	86.4%				83.7%	88.1%	
34.29 - 33.5	1858	2025	3882	24.36	27.00	51.36	53.7%							96.1%	87.2%				84.4%	88.9%	
33.5 - 33.25	1869	3575	5444	24.41	45.00	69.41	38.4%						61.5%	68.7%	64.0%				62.3%	64.6%	
33.25 - 32	1930	3648	5578	24.67	45.00	69.67	39.0%						62.3%	69.7%	64.9%				63.2%	65.6%	
32 - 31.75	1944	2542	4485	24.73	31.50	56.23	49.7%						79.2%						78.7%	82.5%	
31.75 - 28.5	2110	2675	4785	25.41	31.50	56.91	51.4%						81.7%						81.3%	85.2%	
28.5 - 28.25	2122	4355	6477	25.47	49.50	74.97	38.0%		55.2%	57.2%		61.1%	60.5%						61.7%	63.8%	
28.25 - 27.75	2148	4389	6537	25.57	49.50	75.07	38.2%		55.5%	57.5%		61.4%	60.8%						62.0%	64.2%	
27.75 - 27.5	2185	5387	7573	25.62	56.75	82.37	35.1%		48.8%	54.0%		56.0%	57.0%					50.7%	61.0%		
27.5 - 27.25	2215	3677	5892	25.68	38.75	64.43	46.2%		62.0%	70.4%		73.9%						65.2%	80.4%		
27.25 - 27.08	2224	3686	5911	25.71	38.75	64.46	46.3%		62.1%	70.6%		74.0%						65.3%	80.6%		
27.08 - 26.83	2304	2758	5062	25.77	28.25	54.02	56.7%		70.9%	86.5%								76.9%			
26.83 - 21.83	2593	2978	5571	26.82	28.25	55.07	59.0%		73.9%	89.8%								80.0%			
21.83 - 16.83	2906	3206	6113	27.88	28.25	56.13	61.1%		76.7%	92.8%								82.8%			
16.83 - 15.45	2997	3271	6268	28.17	28.25	56.42	61.6%		77.4%	93.6%								83.6%			
15.45 - 15.2	3198	1549	4747	28.22	34.25	62.47	88.4%		74.1%		74.5%	65.0%						87.2%			
15.2 - 13.4	3049	4079	7128	28.60	38.75	67.35	53.9%		68.8%	75.2%	86.5%							74.3%			82.8%
13.4 - 13.15	3066	4093	7159	28.65	38.75	67.40	54.0%		68.9%	75.3%	86.7%							74.4%			83.0%
13.15 - 8.15	3415	4382	7798	29.71	38.75	68.46	55.8%		71.3%	77.7%	89.3%							76.8%			85.6%
8.15 - 6.5	3536	4480	8017	30.06	38.75	68.81	56.5%		72.0%	78.5%	90.1%							77.5%			86.5%
6.5 - 6.25	3522	5338	8860	30.11	44.75	74.86	49.8%	69.4%	71.6%	78.6%	71.0%							70.5%			87.0%
6.25 - 4.45	3657	5466	9122	30.49	44.75	75.24	50.4%	70.1%	72.4%	79.4%	71.8%							71.3%			87.9%
4.45 - 4.2	3707	5190	8896	30.54	38.75	69.29	54.4%	90.3%	76.3%	79.5%								78.1%			92.0%
4.2 - 0	4037	5480	9517	31.43	38.75	70.18	56.0%	92.1%	78.0%	81.2%								79.8%			93.9%

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

B+T GRP

PROJECT : 876399
CLIENT : CROWN CASTLE
JOB NO. : BU876399 DATE : 1/17/2019
DESIGN BY : KM
REVIEW BY : US

STRUCTURAL CAPACITY OF MICROPILE (UNCASED SECTION)

INPUT		
Design Load Comp.	160	kips
Production Test Load Comp.	171	
Design Load Ten.	160	kips
Test Load Ten.	171	
Nominal Bar Diameter,db	1.75	
Yield (F_y) - 0.8 f Pu A	270.00	kips
Bar Diameter	1.75	in
Bit Diameter	5.00	in
Grout Strength (G_c)	5.00	ksi
Design Code (AASHTO or NYC)	TIA-222-G A2 (LRFD)	
Unit Weight of Rock rd=	0.110	kcf
Micropile quantity, n	4.00	

REV G ANALYSIS

Net Allow. capacity of each Pile=				160	kips
Base Moment	1918	kip-ft	Load per pile	137	
No. of micropile per leg				4	

Grade 150 All-Thread Rebar - Williams R71

Soil Interaction	**85.63%**	**Pass**
Micropile Steel	**59.26%**	**Pass**

Safety Factor Steel Comp. Design (Yield):	0.64
Safety Factor Steel Comp. Test (Yield):	0.64
Safety Factor Steel Ten. Design (Yield):	0.80
Safety Factor Steel Ten. Test (Yield):	0.80
Safety Factor Grout Design:	0.54
Safety Factor Grout Test:	0.54

Checks:

Load Taken on Grout in Compression $F_g=A_g*(G_c*SF)$

A_g= 17.23 in^2

Design	F_g=	46.68 kips	
Test	F_g=	46.68 kips	

Load Taken on Steel in Compression $F_s=F_y*SF$

*Steel Must Take 40% of Load

Design	F_s=	172.13 kips		**78.7%**	**Pass**
Test	F_s=	172.13 kips			

Total Load Taken on Pile in Compression $F_c=F_g+F_s$

Design	F_c=	218.81 kips	>	160 kips	**Pass**
Test	F_c=	218.81 kips	>	170.67 kips	**Pass**

Total Load Taken on Pile in Tension $F_t=F_y*SF$

	Design	F_t=	216 kips	> 160 kips	**Pass**
Pull Test load Limited to 0.8*fy (PTI) for steel	Test	F_t=	216 kips	> 170.67 kips	**Pass**

GEOTECHNICAL BOND LENGTH OF MICROPILE

Geotechnical Design

Geo-strata 1 ultimate bond stress, tu1 =	0	psi
Geo-strata 2 ultimate bond stress, tu2 =	17	psi
Geo-strata 3 ultimate bond stress, tu3 =	11	psi
Geo-strata 4 ultimate bond stress, tu4 =	21	psi
Geo-strata 5 ultimate bond stress, tu5 =	23	psi
Geo-strata 6 ultimate bond stress, tu6 =	450	psi

	Ult kips/ft	FS (Design)-2		Depth	Load		
Soil-Grout Bond, α1 =	0.00	0.00	kips/ft	10	0.00	kips	
Soil-Grout Bond, α2 =	3.11	2.33	kips/ft	5	11.66	kips	
Soil-Grout Bond, α3 =	2.07	1.56	kips/ft	5	7.78	kips	
Soil-Grout Bond, α4 =	3.86	2.90	kips/ft	5	14.49	kips	
Soil-Grout Bond, α5 =	4.34	3.25	kips/ft	5	16.26	kips	
Soil-Grout Bond, α5 =	84.82	63.62	kips/ft	2	127.23	kips	
Bond Length				22 FT			
Total Length				32 FT	177	kips	Pass

DELTA OAKS GROUP

SUBSURFACE STRENGTH PARAMETERS - MICROPILES

Boring	Depth (bgs)	Ultimate Grout to Ground Bond Strength - Type "A"		Ultimate Grout to Ground Bond Strength - Type "B"	
		Compression (psi)	Uplift (psi)	Compression (psi)	Uplift (psi)
B-1	0.0 – 3.3	-	-	-	-
	3.3 – 6.0	10.0	10.0	14.5	14.5
	6.0 – 8.0	6.5	6.5	8.0	8.0
	8.0 – 10.0	13.5	13.5	21.0	21.0
	10.0 – 15.0	22.0	16.5	34.5	25.5
	15.0 – 20.0	15.0	11.0	20.5	15.0
	20.0 – 25.0	27.5	20.5	45.0	33.5
	25.0 – 30.0	31.0	23.0	52.0	39.0
	30.0 – 50.0	450	450	-	-

- The micropiles should have an adequate design embedment length to resist the applied loads.
- Group effects can contribute to a reduction in resistance for the micropiles and should be taken into consideration during foundation analysis.
- Delta Oaks Group recommends an appropriate factor of safety be utilized and the appropriate manufacturer recommendations be followed for the analysis of the micropiles.

BU: 876705
WO:

Done By: DMC
Checked By: xxx
Date: 10/19/2018

Micropile Calculations

Reference

Number of Micropiles: $n := 4$

Micropile Bolt Circle: $BC := 168in$

Micropile Cross-seectional Area: $A_{mp} := 2.25in^2$

Micropile Capacity: $\phi P_n := 160kip$

Applied Moment: $M :=$ 1918 kip-ft

Micropile Moment of Inertia: $I := \frac{n}{8}\cdot\left(BC^2\right)\cdot A_{mp} = 31752\cdot in^4$

Distance to Extreme Micropile: $c := \frac{BC}{2} = 84\cdot in$

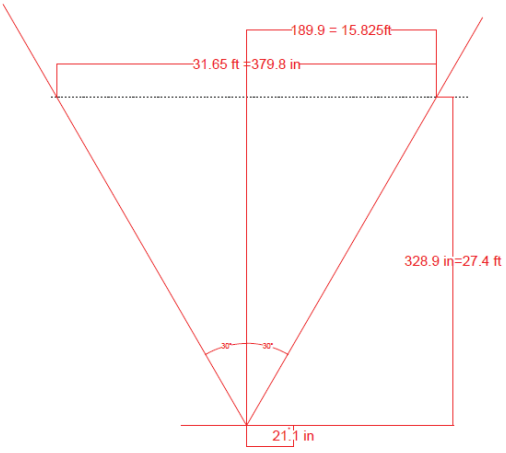
Applied Micropile Force: $P := \frac{M\cdot c\cdot A_{mp}}{I} =$ 137 kip

$RATING := \frac{P}{\phi P_n}$

RATING = 85.62%

Steel Capacity $Frg := 0.8\cdot 120ksi\cdot 2.25in^2 = 216\cdot kip$ controls

Rock Prism Failure:



Development length for 216 kips

$Rn := \Phi\cdot Ab\cdot Frg$

$250kip := 0.75\cdot\pi\cdot 5in\cdot L\cdot 450psi$

$L := \frac{216kip}{0.75\cdot\pi\cdot 5in\cdot 0.45ksi} = 3.4\,ft$

SINGLE ANCHOR

$V := \frac{1}{3}\cdot(31.65ft)^2\cdot\pi\cdot\left(\frac{1}{4}\right)\cdot 27.40ft = 7185.66\cdot ft^3$

Density of the Rock $\delta d := 0.13kcf$

$0.75\cdot\delta d\cdot V = 700.6\cdot kip$

$Rating := 216 \div 700 = 30.86\cdot\%$

GROUP ANCHOR: Failure of Group Rock Mass does't control for compression case

APPENDIX D

TOWER MODIFICATION DRAWINGS

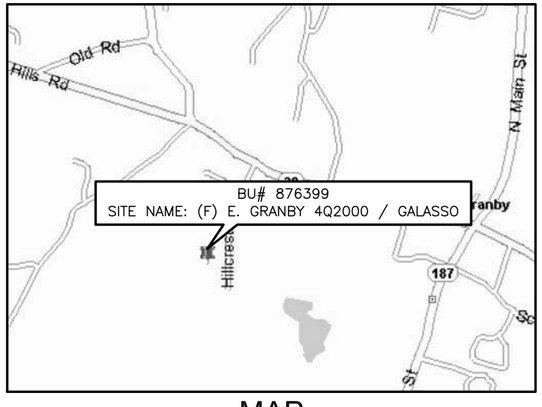
TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SAFETY CLIMB: 'LOOK UP'
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION AND INSPECTION. TOWER REINFORCEMENTS AND EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS.

SITE NAME:
(F) E. GRANBY 4Q2000 / GALASSO

BU NUMBER:
876399

SITE ADDRESS:
60 SOUTH MAIN ST.
EAST GRANBY, CT 06026
HARTFORD COUNTY, USA



MAP

DIRECTIONS
91 NORTH TO EXIT 40 (20 WEST). FOLLOW 20 WEST TO HILLCREST STREET ON LEFT, FOLLOW HILLCREST TO THE GATE. THE ADDRESS FOR THIS SITE WILL TAKE YOU TO THE MAIN ENTRANCE FOR TILCON ON SOUTH MAIN STREET. USE THE HILLCREST GATE TO ACCESS THE SITE.

PROJECT CONTACTS:

1. CROWN PROJECT MANAGER
DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCASTLE.COM

2. CROWN CONSTRUCTION MANAGER
JASON D'AMICO
(860) 209-0104
JASON.DAMICO@CROWNCASTLE.COM

3. ENGINEERING RFI CONTACT
KISHORE MACHANI
(918) 587-4630
KMACHANI@BTGRP.COM
MODDWGS@BTGRP.COM
1717 S BOULDER AVENUE, SUITE 300
TULSA, OK 74119

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM B+T GROUP TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT B+T GROUP AT MODDWGS@BTGRP.COM.

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

HOT WORK INCLUDED	
N/A	BASE GRINDING ONLY
X	BASE WELDING (AND GRINDING)
N/A	AERIAL GRINDING ONLY
X	AERIAL WELDING (AND GRINDING)

TOWER INFORMATION

TOWER MANUFACTURER / JOB #:	EEI / 7832
TOWER HEIGHT / TYPE:	98' MONOPOLE
TOWER LOCATION:	LAT. 41° 56' 29.59"
DATUM: (NAD 1983)	LONG. -72° 44' 19.248"
	ELEV. 262 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 1677972
STRUCTURAL ANALYSIS REPORT:	BLACK & VEATCH / WO. #1604497
STRUCTURAL ANALYSIS DATE:	08/09/18
ORDER ID / REVISION #:	444519 / 0
CCISITES DOCUMENT ID:	7724766

CODE COMPLIANCE
THIS REINFORCEMENT DESIGN HAS BEEN PERFORMED IN ACCORDANCE WITH THE TIA-222-H STANDARD. THIS ANALYSIS UTILIZES AN ULTIMATE 3-SECOND GUST WIND SPEED OF 120 MPH FROM THE 2018 CONNECTICUT BUILDING CODE AND THE 2015 INTERNATIONAL BUILDING CODE. EXPOSURE CATEGORY C AND RISK CATEGORY II WERE USED IN THIS REINFORCEMENT DESIGN.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES
S4	NG2 BOLT NOTES AND DETAILS
S5	FORGBOLT NOTES AND DETAILS
S6	AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S7	TOWER ELEV., SCHEDULE & TX LINE DIST. DIAG.
S8	SITE PLAN AND NOTES
S9	FOUNDATION MODIFICATION
S10	FOUNDATION SECTION
S11	TOWER SECTIONS (0'-30.5' AND 25.58'-55.58')
S12	IN-LINE SPLICE DETAIL
D1	ANCHOR ROD BRACKET DETAILS
D2	ANCHOR ROD BRACKET DETAIL

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/18/19	ISSUED FOR CONSTRUCTION
1	06/13/19	REV CODE COMPLAINCE

PROJECT NO:	127643.004.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER: S1

REVISION: 1

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE-CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED-SOW-10007	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVED SHOP DRAWINGS	CED-SOW-10007	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	CED-SOW-10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED-SOW-10007 CED-STD-10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED-SOW-10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED-SOW-10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION REPORT	CED-SOW-10066 CED-STD-10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE OF MONOPOLE BASE PLATE	ENG-SOW-10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED-SOW-10007	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
CONSTRUCTION			
X	FOUNDATION INSPECTIONS	CED-SOW-10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED-SOW-10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
X	EARTHWORK	CED-SOW-10144	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
X	MICROPILE/ROCK ANCHOR	CED-SOW-10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
X	POST-INSTALLED ANCHOR ROD VERIFICATION	CED-SOW-10007	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	BASE PLATE GROUT VERIFICATION	ENG-STD-10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
X	FIELD CERTIFIED WELD INSPECTION	CED-SOW-10066 CED-STD-10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON-SITE COLD GALVANIZING VERIFICATION	ENG-STD-10149 ENG-BUL-10149	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
N/A	TENSION TWIST AND PLUMB	CED-PRC-10182 CED-STD-10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS-BUILT DRAWINGS	CED-SOW-10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED WHEN THE EOR IS SPECIFYING ADDITIONAL INSPECTIONS DESCRIPTION AND APPLICABLE STANDARDS SHALL BE APPLIED.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
POST-CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED-SOW-10007	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
X	POST-INSTALLED ANCHOR ROD PULL TESTS	CED-PRC-10119	POST-INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED-SOW-10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
N/A	BOLT INSTALLATION VERIFICATION REPORT	CED-SOW-10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE-TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED-PRC-10283 CED-FRM-10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED-SOW-10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
X	MICROPILE		MICROPILE TESTING AND INSPECTION PER ASTM D3687-07

NOTE: "X" DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND "N/A" DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.

MODIFICATION INSPECTION NOTES

GENERAL

THE MI IS AN ON-SITE VISUAL AND HANDS-ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.

ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED-LST-10173, "APPROVED MI VENDORS".

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (POC).

REFER TO CROWN CED-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:

- THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO CROWN DOCUMENT # CED-SOW-10007.

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TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/18/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.004.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT VANCE
31627
LICENSED
PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE

MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER: S2

REVISION: 0

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE **TIA–222–H,** ANSI/ASSE A10.48 AND ANSI/TIA–322 AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES IN ACCORDANCEWITH ENG–BUL–10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3–SEC) PER TIA–1019.
1.6 ALL CONSTRUCTION MEANS AND METHODS: INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED–STD–10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA–322 (LATEST EDITION).
1.7 ALL THE PARTS STARTING WITH "CCI–" DESIGNATION – REFER TO "CROWN CASTLE APPROVED REINFORCEMENT COMPONENTS CATALOGUE EDITION 1" FOR PART DETAILS.
1.8 BLIND BOLTS ARE TO BE 20MM DIAMETER WITH CORRESPONDING 29MM DIAMETER SLEEVE WITH SPECIFIED STEEL GRADE.
1.9 ALL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION PER ASTM A153 / A153M OR A123, AS APPLICABLE. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO BRUSH COATS OF CROWN APPROVED ZINC RICH PAINT SHALL BE APPLIED IN ACCORDANCE WITH ENG–BUL–10149 TOWER PROTECTIVE COATINGS BULLETIN.
1.10 ALL SHIMS SHALL BE ASTM A36.
1.11 HOLES FOR BOLTS AND SHEAR SLEEVES ARE 30MM, U.N.O.
1.12 SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
1.13 IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
1.14 THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS WRITTEN APPROVAL OF YOUR CROWN P.O.C. ALL ALTERATIONS TO A SAFETY CLIMB'S ORIGINAL MANUFACTURER'S CONFIGURATION MUST BE DESIGNED BY THE ENGINEER OF RECORD. IF THE GENERAL CONTRACTOR FINDS THAT THE CLIMBING FACILITIES ARE IMPEDED, EITHER DURING BIDDING, DURING PRE–FABRICATION MAPPING, OR WHILE ON–SITE, THE GENERAL CONTRACTOR SHALL CONTACT THE CROWN P.O.C. TO DETERMINE A METHOD OF RESOLUTION.
1.15 WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN–LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'–0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
1.16 ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GC AND/OR FABRICATOR.
1.17 IF, DURING THE COURSE OF A FOUNDATION MODIFICATION, THE GC ENCOUNTERS EXISTING CONDUIT LOCATED WITHIN THE CONFINES OF THE EXISTING OR PROPOSED FOUNDATION CONCRETE, AND THIS CONDUIT IS NOT IN A LOCATION THAT IS SPECIFIED WITHIN THESE DESIGN DRAWINGS, THE GC SHALL IMMEDIATELY CONTACT THE E.O.R. FOR GUIDANCE BEFORE PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS. IF CONDUIT IS TO BE INSTALLED THROUGH THE EXISTING FOUNDATION OR PROPOSED FOUNDATION MODIFICATIONS AND HASN'T BEEN SPECIFIED WITHIN THESE DESIGN DRAWINGS THEN THE GC SHALL IMMEDIATELY CONTACT THE E.O.R. FOR GUIDANCE PRIOR TO PROCEEDING WITH THE INSTALLATION OF THE PROPOSED FOUNDATION MODIFICATIONS.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572
B. STEEL PIPE (HSS TUBING)	50ksi	A500 GR. C
C. STEEL PIPE	50ksi	---

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE **E80** SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

FIELD NDE MINIMUM REQUIREMENTS

3.1 ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.
3.2 FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.
3.3 FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'–0".
3.4 FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG–SOW–10033: TOWER BASE PLATE NDE, AND ENG–BUL–10051: NDE REQUIREMENTS FOR MONOPOLE TO PREVENT CONNECTION FAILURE. NOTIFY THE E.O.R. AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.
3.5 ALL TESTING LIMITATIONS SHALL BE NOTED IN THE NDE REPORT.

BASEPLATE GROUT REMOVAL

4.1 THE GC SHALL BEGIN THIS PROCEDURE AS EARLY AS POSSIBLE DURING THE MODIFICATION PROCESS SO THAT IF ISSUES ARISE, THEY CAN BE RESOLVED WITHIN THE ANTICIPATED MODIFICATION TIMELINE.
4.2 IF ANY DETERIORATED GROUT EXISTS, BEGIN AT THIS LOCATION. REMOVE DETERIORATED GROUT AND THE GROUT AROUND THE NEAREST ONE OR TWO ANCHOR RODS TO FULLY EXPOSE THE LEVELING NUT. IF THE GC DISCOVERS THAT A HALF NUT OR JAM NUT WAS USED AS A LEVELING NUT, OR IF NO LEVELING NUT IS PRESENT, IMMEDIATELY CONTACT CED AND THE CROWN POC (TYPICALLY THE MOD PM) FOR A RESOLUTION. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.
4.3 OTHERWISE, CHECK THE LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG–PRC–10012 "BASE PLATE GROUT REPAIR". IF SEVERE CORROSION / MATERIAL LOSS IS FOUND OR CORROSION EXISTS TO THE POINT WHERE THE LEVELING NUT IS UNABLE TO BE TIGHTENED WHEN OBVIOUSLY LOOSE, IMMEDIATELY NOTIFY THE CROWN POC (TYPICALLY THE MOD PM). REFERENCE ENG–BUL–10114 "RUST CLASSIFICATION" FOR EXAMPLES OF MATERIAL LOSS. DO NOT REMOVE ANY ADDITIONAL GROUT UNTIL DIRECTED TO BY CROWN.
4.4 IN THE EVENT THAT SEVERE CORROSION IS NOT ENCOUNTERED, AND BEING SURE TO CHECK EACH ANCHOR ROD FOR CORROSION PER ENG–BUL–10114 "RUST CLASSIFICATION", REMOVE ALL EXISTING BASEPLATE GROUT WHILE CHECKING EACH LEVELING NUT FOR TIGHTNESS IN ACCORDANCE WITH SECTION 1.3.2.3 OF ENG–PRC–10012 "BASE PLATE GROUT REPAIR".
4.5 CONSISTENT WITH SECTION 1.3.2.4 OF ENG–PRC–10012 "BASE PLATE GROUT REPAIR", HAND TOOL CLEAN TO SSPC–SP2 AND SOLVENT CLEAN TO SSPC–SP1, ALL EXPOSED STRUCTURAL STEEL ELEMENTS, INCLUDING ANCHOR RODS, LEVELING NUTS AND UNDERSIDE OF BASE PLATE TO THE GREATEST EXTENT POSSIBLE, ENSURE THAT ALL OLD GROUT IS REMOVED TO ALLOW COLD GALVANIZING TO ADHERE TO THE STEEL.
4.6 APPLY BY BRUSH TWO COATS OF A CROWN–APPROVED COLD–GALVANIZING COMPOUND TO ALL EXPOSED STRUCTURAL STEEL ELEMENTS BENEATH THE BASE PLATE AND ALLOW CURING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. A LIST OF CROWN–APPROVED DIRECT APPLICATION COLD–GALVANIZING COMPOUNDS CAN BE FOUND IN ENG–STD–10149 "TOWER PROTECTIVE COATINGS GUIDELINES" SECTION 2.1.1.
4.7 THE GC SHALL PROVIDE PHOTOS OF EACH ANCHOR ROD WITH LEVELING NUT AFTER CLEANING BUT BEFORE COLD–GALVANIZATION AND ALSO AGAIN AFTER COLD–GALVANIZATION, FOR INCLUSION IN THE MI REPORT.

KEY NOTES

(#) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

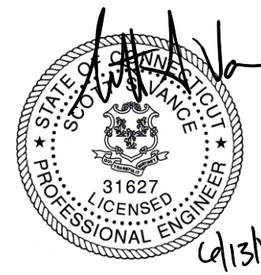
CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/18/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.004.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20



(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

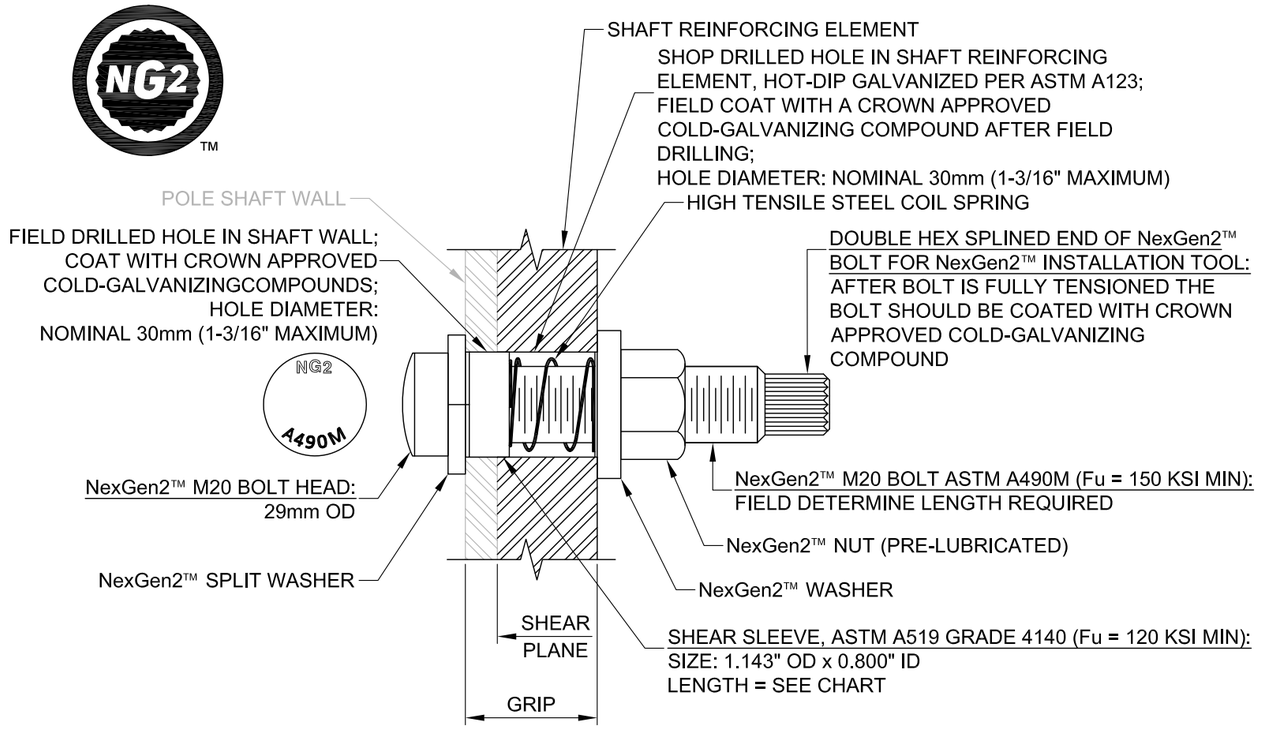
SHEET TITLE

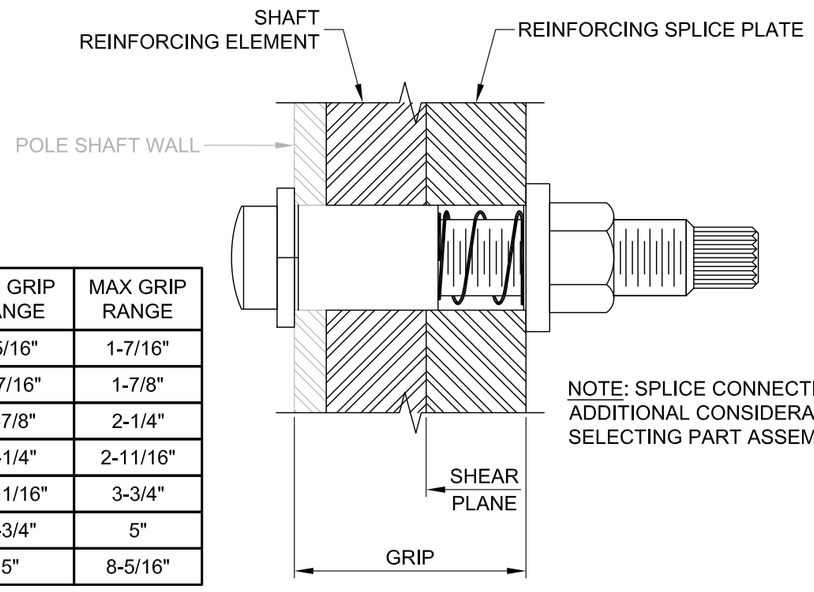
GENERAL NOTES

SHEET NUMBER: S3

REVISION: 0

INTERIOR OF POLE SHAFT	EXTERIOR OF POLE SHAFT





NOTE: SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
2NG2036	M20x95	11/16"	15/16"	1-7/16"
2NG2048	M20x95	1-3/16"	1-7/16"	1-7/8"
2NG2057	M20x95	1-5/8"	1-7/8"	2-1/4"
2NG2068	M20x135	2"	2-1/4"	2-11/16"
2NG2096	M20x135	2-7/16"	2-11/16"	3-3/4"
2NG2127	M20x175	3"	3-3/4"	5"
2NG2212	M20x250	4"	5"	8-5/16"

NOTES:

1. ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30mm DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1 3/16".
2. NexGen2™ COMPLETE ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AS APPROPRIATE.
3. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER:

ALLFASTENERS
959 LAKE ROAD
MEDINA, OHIO, USA 44256
PHONE: 440-232-6060
WEBSITES: WWW.ALLFASTENERS.COM WWW.AFTOWER.COM

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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CROWN CASTLE

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B+T ENGINEERING, INC.
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STATE OF CONNECTICUT
SCOTT D. GUILLIANCE
31627
LICENSED
PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

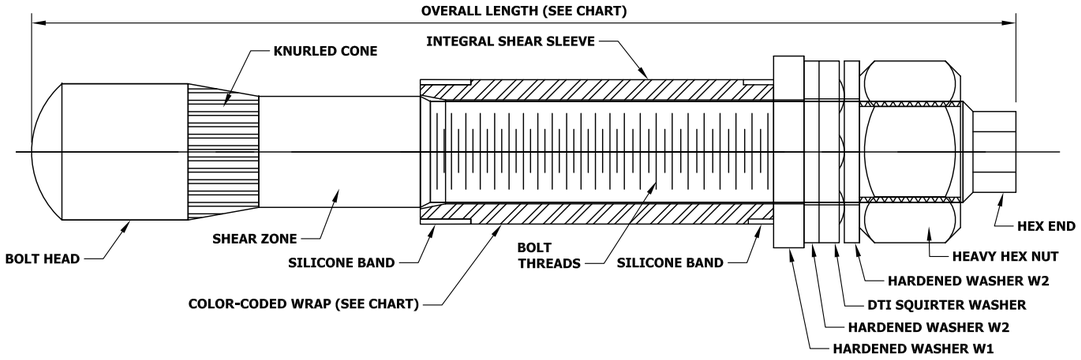
SHEET TITLE

NG2 BOLT NOTES AND DETAILS

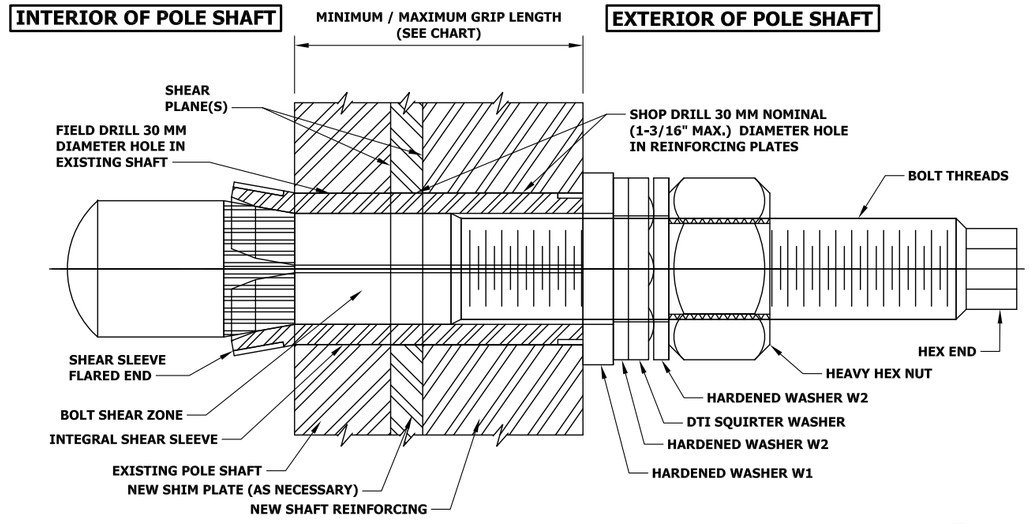
SHEET NUMBER: S4

REVISION: 0

NOTES:
1. **ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**
2. **ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.**



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2

BOLT HOLE NOTES:

1. **ALL SHOP-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM SHOP-DRILLED HOLE DIAMETER PERMITTED IS 1-3/16".**
2. **ALL FIELD-DRILLED HOLES SHALL BE NOMINAL 30 MM DIAMETER. THE MAXIMUM FIELD-DRILLED HOLE DIAMETER PERMITTED IS 30 MM.**

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: **888-926-4857**
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	**135**	5.31	1.3	3/8" to 1"	--	**RED**
2	**160**	6.30	1.6	3/4" to 1-1/2"	--	**GREEN**
3	**195**	7.68	1.9	1-1/4" to 2-1/4"	--	**BLUE**
4	**260**	10.24	2.6	2" to 3-1/2"	Splice Bolt	**YELLOW**
5	**365**	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	**ORANGE**
6	**440**	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	**BLACK**
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FORGBolt™ Installation

Follow all Manufacturer/Distributer Recommendations for Installation, Tightening, and Inspection.

1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

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CROWN CASTLE

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6/13/19

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60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
FORGBOLT NOTES AND DETAILS

SHEET NUMBER: S5
REVISION: 0

AJAX FASTENERS

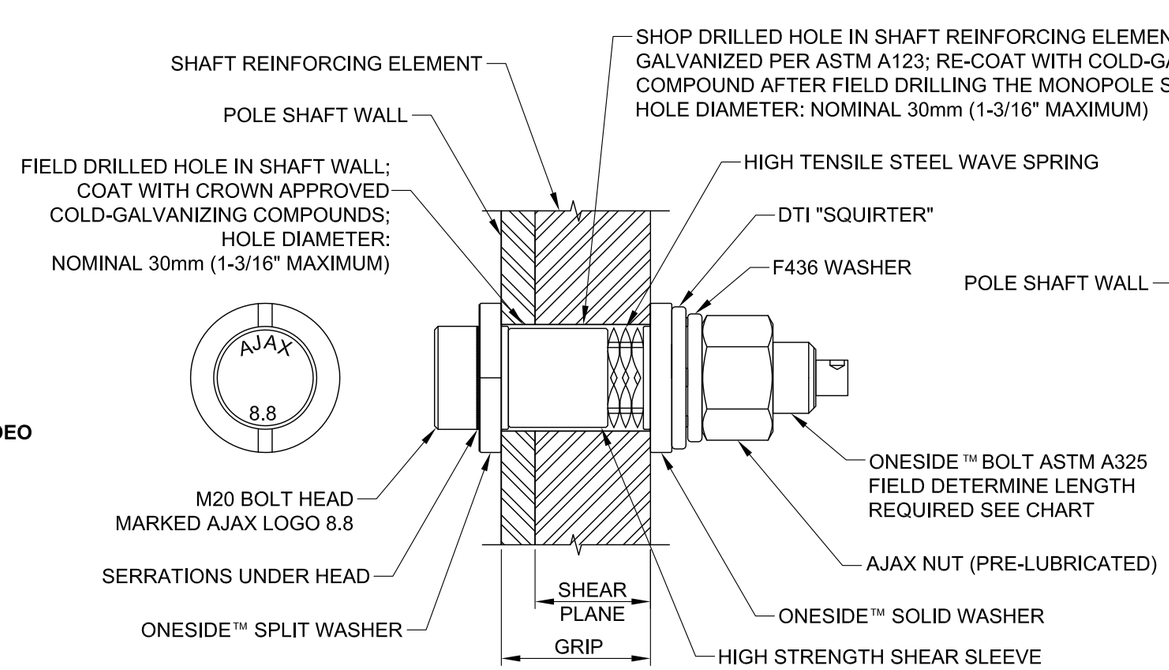
ONESIDE™

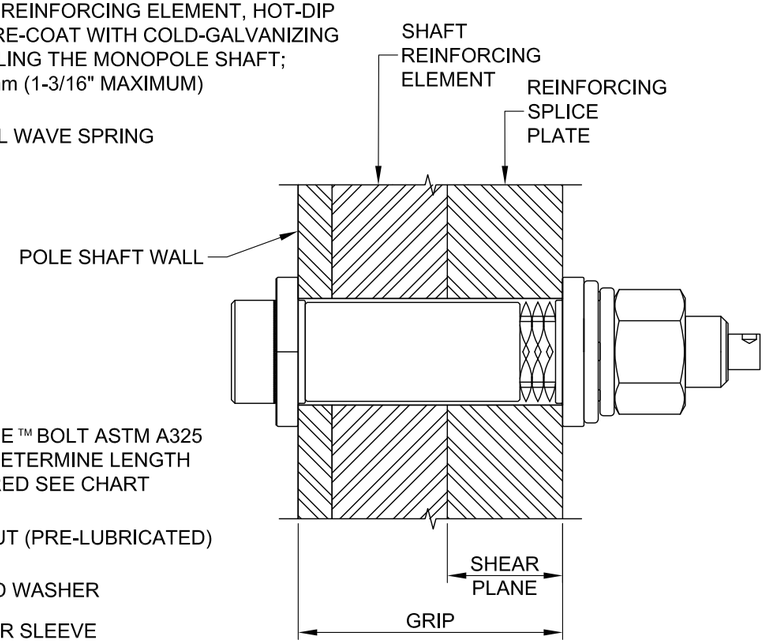
PATENT US 7,373,709B2

MANUFACTURER INSTALLATION VIDEO

https://www.youtube.com/watch?v=ZGBS0eLrZsw&feature=em-share_video_user

INTERIOR OF POLE SHAFT | EXTERIOR OF POLE SHAFT





NOTE:
SPLICE CONNECTIONS REQUIRE ADDITIONAL CONSIDERATION WHEN SELECTING PART ASSEMBLIES

AJAX ONESIDE™ BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

MANUFACTURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

DISTRIBUTOR
IRA SVENSGAARD AND ASSOCIATES
PETER SVENDSGAARD - PETERS@IRASVENS.COM
JOHN KILLAM - JOHN@IRASVENS.COM
PHONE (530) 647-8225
FAX (530) 647-8229

BOLT ASSEMBLY AND INSTALLATION:
1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

INSPECTION:
1. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
2. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW*.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/18/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.004.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT · SCOTT VANCE · 31627 · LICENSED PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2000 / GALASSO 876399

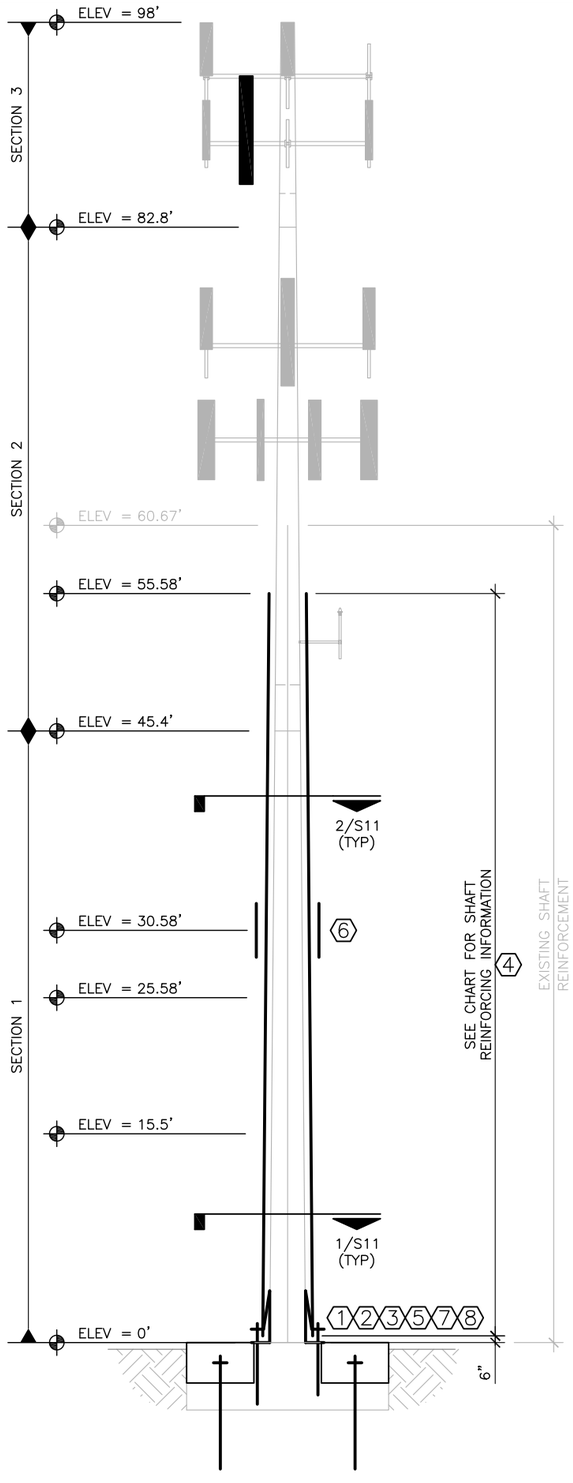
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
AJAX ONESIDE™ BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

SHEET NUMBER: S6

REVISION: 0



1 TOWER ELEVATION
SCALE: N.T.S.

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	FLAT #	BOLTS PER PLATE	TOTAL BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
0'–6"	30'–6"	CCI–SFP–06512530	30'–0"	2	2 & 15	37	74	11	11	19"	1658	LBS.
0'–6"	15'–6"	CCI–SFP–04510015	15'–0"	1	7	19	19	6	6	20"	230	LBS.
25'–7"	55'–7"	CCI–SFP–04510030	30'–0"	1	8	28	28	6	6	20"	459	LBS.
30'–7"	55'–7"	CCI–SFP–04510025	25'–0"	2	2 & 15	25	50	6	6	20"	765	LBS.
							171				3112	LBS.

ALL BOLTS SHALL BE PRE–APPROVED BLIND M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT E.O.R. APPROVAL.
2. FOR PLATES STARTING AT 6", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" +/– 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE RUN SHALL BEGIN AT THE PROPOSED ELEVATION +/– 3". FOR MULTIPLE PLATE SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE BOTTOM PLATE TO THE TOP OF THE TOP PLATE.

TOWER MODIFICATIONS:

1. MODIFY FOUNDATION
   RE: SHEET S8 THRU S10.
2. REMOVE EXISTING BASE PLATE STIFFENERS AT 0'
   RE: SHEET S11.
3. REMOVE EXISTING ANCHOR ROD BRACKET AND INSTALL NEW ANCHOR ROD BRACKET AT 0'
   RE: SHEET S11.
4. INSTALL NEW REINFORCING ELEMENTS FROM 0.5' TO 55.58'
   RE: SHEET S11.
5. INSTALL NEW ANCHOR RODS AND ANCHOR ROD BRACKETS WITH FOOT PADS AT 0'
   RE: SHEET S11.
6. INSTALL NEW IN–LINE SPLICE AT 30.58'
   RE: SHEET S12.
7. REMOVE EXISTING BASE PLATE GROUT. SEE BASE PLATE GROUT REMOVAL NOTES SHEET S3.
8. RE–INSTALL BASE PLATE GROUT (AFTER ALL BASE WORK) PER ENG–PRC–10012 "BASE PLATE GROUT REPAIR"

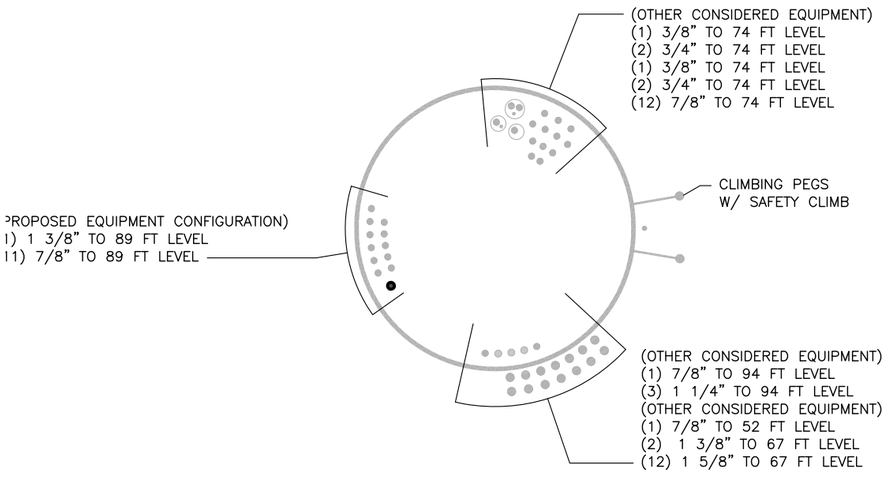
A. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR FABRICATOR.
B. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S7.
C. MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES. AN IBM PROVIDED BY A REGISTERED PROFESSIONAL ENGINEER WILL SUPERSEDE THIS CONDITION / REQUIREMENT.

EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	ASTM STEEL GRADE	Fy (ksi)	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	18	0.3125"	N/A	65	32.00"	21.50"	41"
2	18	0.2500"	N/A	65	22.86"	14.26"	29"
3	18	0.1875"	N/A	65	15.28"	12.00"	---
EXISTING BASE PLATE GRADE = 60 ksi (ASTM GRADE = A871)							
EXISTING ANCHOR RODS = 2.25"ø AND GRADE = 75 ksi							

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED

REFERENCE DRAWINGS BY:	DATE
IETS ENGINEERING SERVICES	11/03/09
PAUL J. FORD & COMPANY	06/27/12
GPD ENGINEERING AND ARCHITECTURE PROFESSIONAL CORPORATION	07/29/15



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
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CROWN CASTLE

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SCOTT C. SUSTMANN
31627
LICENSED
PROFESSIONAL ENGINEER
6/28/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

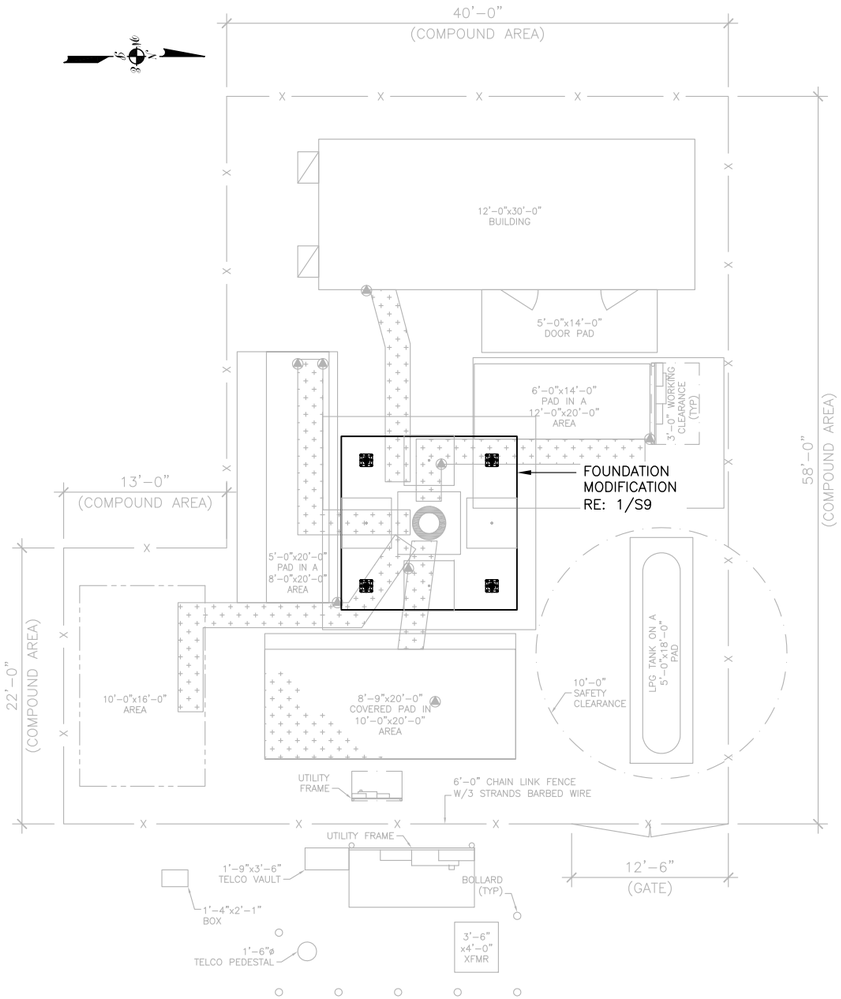
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
TOWER ELEV., SCHEDULE AND TX LINE DIST. DIAG.

SHEET NUMBER: S7

REVISION: 0



1 SITE PLAN
SCALE: N.T.S.

CONTRACTOR NOTES:

1. THE CONTRACTOR SHALL WALK THIS SITE PRIOR TO BIDDING.
2. TOWER FOUNDATION IS IN CLOSE PROXIMITY TO EXISTING PADS, BUILDINGS, AND FENCE. IF DAMAGE OCCURS DURING INSTALLATION OF FOUNDATION MODIFICATIONS, CONSTRUCTION PRICE SHALL INCLUDE REPLACEMENT OR REPAIR OF THE DAMAGED ITEMS.
3. ALL WORK SHALL COMPLY WITH LOCAL CODES, SAFETY REGULATIONS AND UNLESS NOTED OTHERWISE, THE LATEST EDITION OF ACI 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE".
4. IF ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS AND/OR CONDITIONS SPECIFIED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY WORK THAT WOULD BE AFFECTED.
5. TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY B+T GROUP IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.
6. TEMPORARY REMOVAL/PERMANENT RELOCATION OF THE GROUND EQUIPMENT MAY BE REQUIRED. THE GC SHALL OBTAIN THE TOWER OWNER'S PERMISSION PRIOR TO TEMPORARY REMOVAL/PERMANENT RELOCATION.
   ***** NOTES 7 AND 8 APPLY ONLY TO NEW GUY ANCHOR FOUNDATIONS *****
7. NEW FOUNDATION TO BEAR AT THE MINIMUM SPECIFIED DEPTH. IF MINIMUM EXCAVATION DEPTH IS NOT MET, CONTACT E.O.R. PRIOR TO PROCEEDING.
8. ANGLE OF ANCHOR SHAFT DEPENDS ON FINAL BEARING DEPTH. REPORT ANY DEVIATIONS AND COORDINATE WITH THE E.O.R. BEFORE PROCEEDING.

EXCAVATION NOTES:

1. CONTRACTOR SHALL EMPLOY ALL NECESSARY MEASURES TO PROTECT EXISTING STRUCTURES, FOUNDATIONS AND UTILITIES DURING EXCAVATION AND CONSTRUCTION OF THE FOUNDATIONS.
2. CONTRACTOR SHALL NOT UNDERCUT THE EXISTING FOUNDATION.
3. BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM UNIT WEIGHT OF 115 PCF OR THE NET WEIGHT SPECIFIED IN THE GEO-TECH REPORT. THE SOIL SHALL BE INSTALLED IN 6" TO 8" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE APPROPRIATE UNIT WEIGHT.
4. FIELD MEASUREMENT OF SPECIFIED DENSITY IS RECOMMENDED. THE GEOTECHNICAL ENGINEER HAS LIBERTY TO CHOOSE BEST METHOD TO EMPLOY TO ENSURE PROPER COMPACTION IS ACHIEVED AND UNIT WEIGHT IS REACHED AS DESIRED. DIRECT FIELD DENSITY MEASUREMENT TEST PER ASTM D1556: SAND-CONE METHOD, ASTM D2937: DRIVE CYLINDER METHOD, OR ASTM D2167: RUBBER BALLOON METHOD IS ACCEPTABLE. INDIRECT TEST SUCH AS ASTM D6938: NUCLEAR METHOD IS ALSO ACCEPTABLE WITH GEOTECHNICAL ENGINEER'S APPROVAL.
5. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL INVESTIGATION REPORT
   CCI DOC # 1531971
   PREPARED BY DELTA OAKS GROUP
   DATED 10/19/18
6. WATER TABLE WAS NOT ENCOUNTERED DURING GEO-TECH INVESTIGATION.

CONCRETE NOTES:

1. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL SP-66 (LATEST REVISION).
2. REINFORCING BARS SHALL BE GRADE 60 DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615, EXCEPT TIES WHICH MAY BE ASTM A615 (GRADE 40). USE CLASS B LAP SPLICES.
3. ALL REINFORCING BARS SHALL BE TIED WITH TIE WIRE AT ALL REINFORCING BAR INTERSECTIONS. THE CONTRACTOR SHALL SUPPORT THE REINFORCING BAR MAT WITH STEEL CHAIRS SPACED NO MORE THAN 4 FEET O.C.
4. ALL WATER SHALL BE REMOVED FROM THE BOTTOM OF THE EXCAVATION PRIOR TO COMPACTING FILL AND PLACING CONCRETE.
5. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL WHERE POSSIBLE. FORMS, WHEN REQUIRED SHALL BE REMOVED PRIOR TO BACKFILLING.
7. PREPARE AND SUBMIT BATCH TICKETS FOR EACH TYPE AND STRENGTH OF CONCRETE.
8. FOR FIELD MIXING, PREPARE AND SUBMIT MIX DESIGNS FOR PRE-APPROVAL FOR EACH TYPE AND STRENGTH OF CONCRETE IN ACCORDANCE WITH ACI 211, "PROPORTIONING CONCRETE MIXTURES", AND ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE".
9. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE.
10. SLUMP TEST SHALL BE MADE IN ACCORDANCE WITH ASTM C143. THE ALLOWABLE CONCRETE SLUMP SHALL BE 4 INCHES (±1") UNLESS ADMIXTURES ARE USED. ADMIXTURE SHALL BE IN ACCORDANCE WITH ASTMC494 STANDARD TYPES A, B, C, D OR E.
11. THE ENGINEER SHALL PRE-APPROVE SUPERPLASTICIZER USE.
12. CEMENT SHALL CONFORM TO ASTM C150 TYPE II. FINE AGGREGATE SHALL CONFORM TO ASTM C33. COURSE AGGREGATE SHALL BE GRAVEL OF CRUSHED STONE CONFORMING TO ASTM C33. MAXIMUM AGGREGATE SIZE SHALL BE 3/4".
13. WATER SHALL BE CLEAN AND FREE FROM OILS, ACIDS, ALKALIES AND ORGANIC MATERIALS. NO ADDITIONAL WATER SHALL BE ADDED TO THE CONCRETE AT THE JOB SITE.
14. DO NOT USE CHLORIDE-CONTAINING ADMIXTURES.
15. AIR ENTRAINING ADMIXTURES SHALL CONFORM TO ASTM C260.
16. HOT WEATHER CONCRETE PLACEMENT SHALL COMPLY WITH ACI 305R. COLD WEATHER CONCRETE PLACEMENT SHALL COMPLY WITH ACI 306.1.
17. CONCRETE SHALL BE PLACED WITH 24 HOURS OF EXCAVATION INSPECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXPOSED EXCAVATIONS PRIOR TO CONCRETE PLACEMENT.
18. PLACE CONCRETE BY USING A CHUTE OR HOPPER DEVICE SUCH THAT CONCRETE SHALL NOT FREE FALL FROM A HEIGHT GREATER THAN 5 FEET. DEPOSIT CONCRETE WITHIN THE CENTER OF THE STEEL REINFORCING CAGE TO PREVENT SEGREGATION.
19. CONSOLIDATE PLACED CONCRETE WITH MECHANICAL VIBRATING EQUIPMENT IN ACCORDANCE WITH ACI 309R. DO NOT USE VIBRATORS TO TRANSPORT CONCRETE.
20. CONCRETE SHALL BE CURED IN ACCORDANCE WITH ACI 301. WHEN APPLICABLE, CURING COMPOUNDS SHALL BE WATER CLEAR, STYRENE ACRYLATE TYPE A MINIMUM SOLIDS CONTENT OF 30%. APPLICATION SHALL BE IN CONFORMANCE WITH MANUFACTURE'S INSTRUCTIONS.
21. ALL CONCRETE TESTING SHALL BE ACCORDANCE WITH ACI 318. A MINIMUM OF (2) 6"x12" CONCRETE CYLINDERS PER ANCHOR BLOCK AND A MINIMUM OF (6) 6"x12" CYLINDERS PER BATCH REQUIRED.
22. FOR THE LESSER OF 26 C.Y. OR ONE DAY'S PLACEMENT, A MINIMUM OF 4 CONCRETE CYLINDERS SHALL BE TAKEN. CONCRETE SHALL BE TESTED AS REQUIRED BY OWNER'S PROJECT MANAGER.

B+T GRP
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PROJECT NO:	127643.004.01
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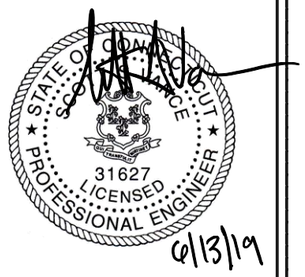


(F) E. GRANBY 4Q2000 / GALASSO
876399

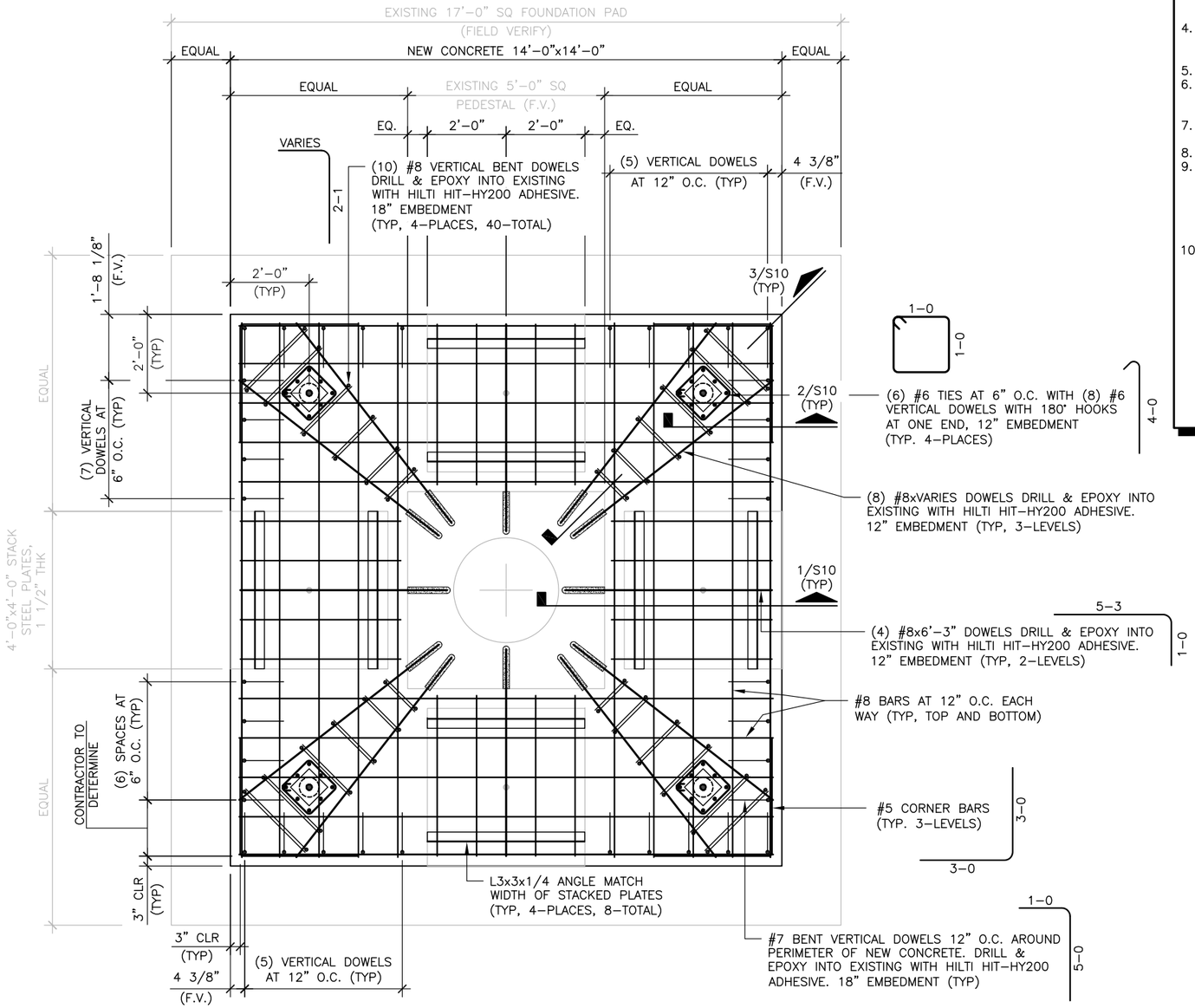
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE

SITE PLAN AND NOTES

SHEET NUMBER:	REVISION:
S8	0



1 FOUNDATION MODIFICATION
SCALE: N.T.S.

MICROPILE NOTES:

1. THE CONTRACTOR SHALL WALK THIS SITE PRIOR TO BIDDING. THE LOCATION OF SOME OF THE EXISTING EQUIPMENT ON THE PAD WASN'T AVAILABLE AT THE TIME OF DESIGN. CHANGES TO THE MICROPILE LAYOUT MAY BE NECESSARY TO FACILITATE INSTALLATION.
2. ALL DIMENSIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING MATERIALS.
3. BARS SHALL BE EPOXY COATED OR HOT DIP GALVANIZED WITH FABRICATED GREASED PVC SLEEVE THROUGH THE STRESSING LENGTH (UNO). THE PROPERTIES OF THE BAR SHALL CONFORM TO ASTM A519 OR A613 FOR TYPE-E, ASTM A722 FOR 150 KSI FOR TYPE-A, AND ASTM A615 FOR 75 KSI ALL THREAD RODS FOR TYPE-A INSTALLATIONS.
4. USE PVC CENTRALIZERS TO ASSURE GOOD GROUT COVER AROUND THE BAR. (FOR TYPE-E INSTALLATIONS, USE STEEL CENTRALIZER IN FRONT OF THE COUPLING DURING THE DRILLING OPERATION)
5. GROUT TO HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 5000 PSI.
6. CONTRACTOR SHALL FULLY GROUT THE DRILL HOLE THROUGH A GROUT TUBE RUNNING TO THE BOTTOM OF THE DRILL HOLE UNTIL CLEAN GROUT RETURNS TO THE SURFACE OF THE DRILL HOLE FOR TYPE-A INSTALLATION.
7. ADJACENT MICROPILES SHALL BE INSTALLED WITH AN APPROPRIATE TIME LAG IN ORDER TO LIMIT DISTURBANCE FROM DRILLING.
8. PULL TEST TO CONFORM TO ASTM D3689-07.
9. IT IS RECOMMENDED THAT THE INSTALLATION AND TESTING OF THE MICROPILES BE OBSERVED BY A QUALIFIED REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER OR ANOTHER THIRD PARTY INSPECTOR FAMILIAR WITH THE PROCEDURES FOR INSTALLATION AND TESTING OF ANCHORAGE SYSTEMS. PULL TEST NEEDS TO BE PERFORMED PER THE DIRECTION OF A CROWN APPROVED FOUNDATION INSPECTOR. PULL TEST CAN BE WAIVED OFF IF DEEMED APPROPRIATE BY THE INSPECTOR. PULL TEST TO 171 KIPS.
10. DESIGN CAPACITY CONSIDERED IN THE ANALYSIS: NET ALLOWABLE (TENSION) = 160 KIPS. NET ALLOWABLE (COMPRESSION) = 160 KIPS. CONTRACTOR IS FREE TO USE ANY OTHER MANUFACTURER PROVIDED THEY PROVE THAT THE SUBSTITUTED SYSTEM HAS AN EQUIVALENT CAPACITY OR GREATER.

TO ORDER PARTS CONTACT:

WILLIAMS FORM ENGINEERING CORP.
8165 GRAPHIC DR.
BELMONT, MI 49306
PHONE: (616) 866-0815
E-MAIL: WILLIAMS@WILLIAMSFORM.COM

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PROFESSIONAL ENGINEER
6/13/19

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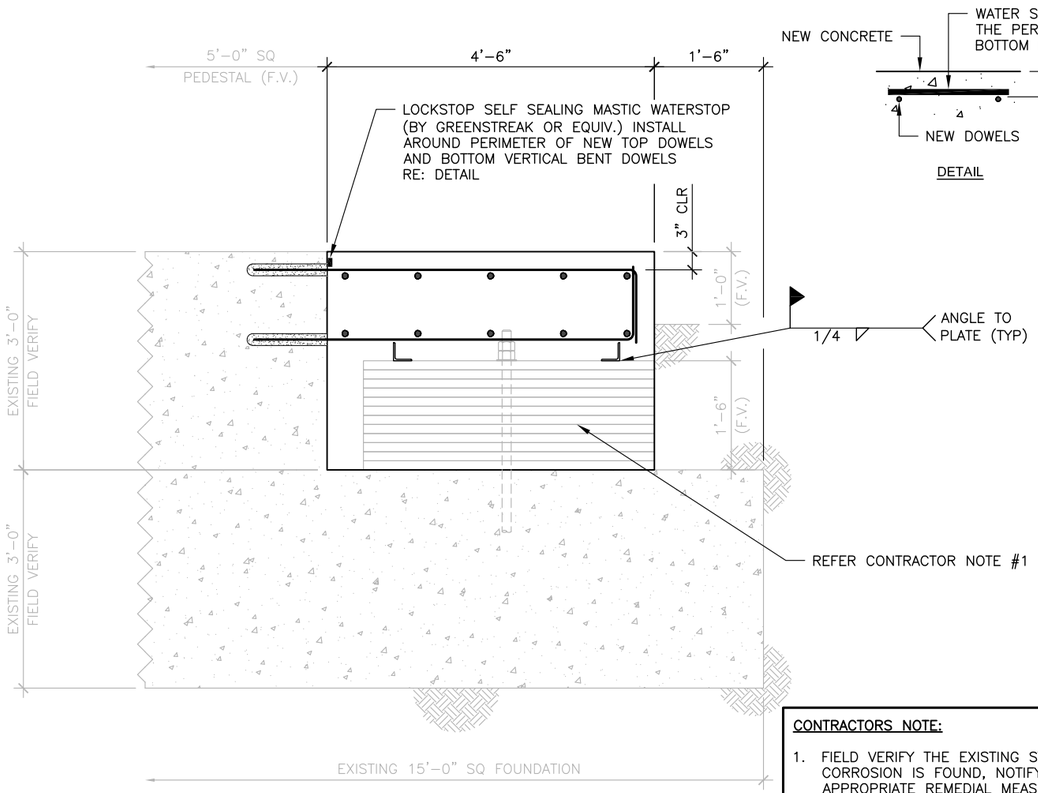
60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE
FOUNDATION MODIFICATION

SHEET NUMBER: S9

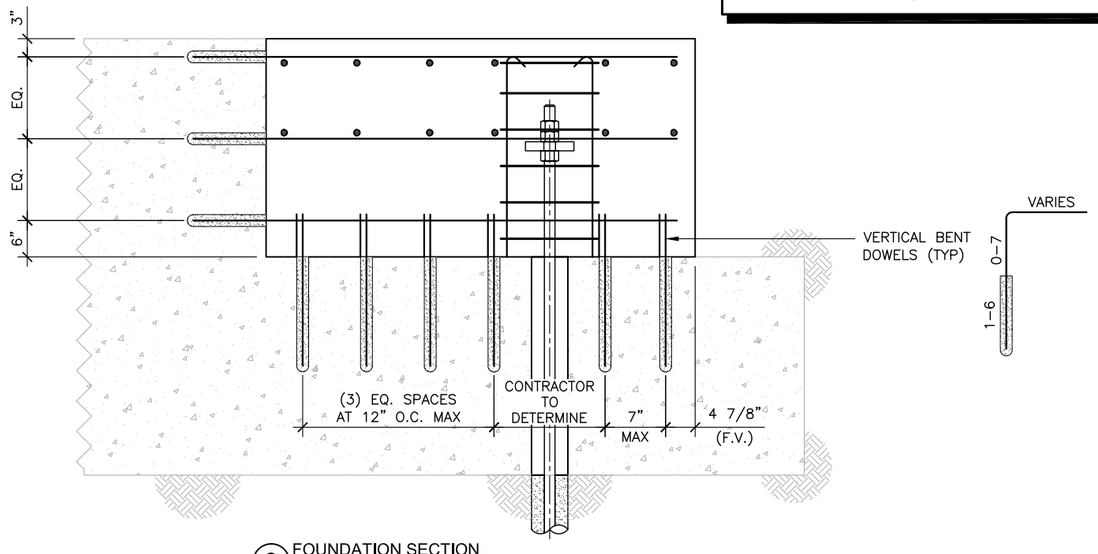
REVISION: 0



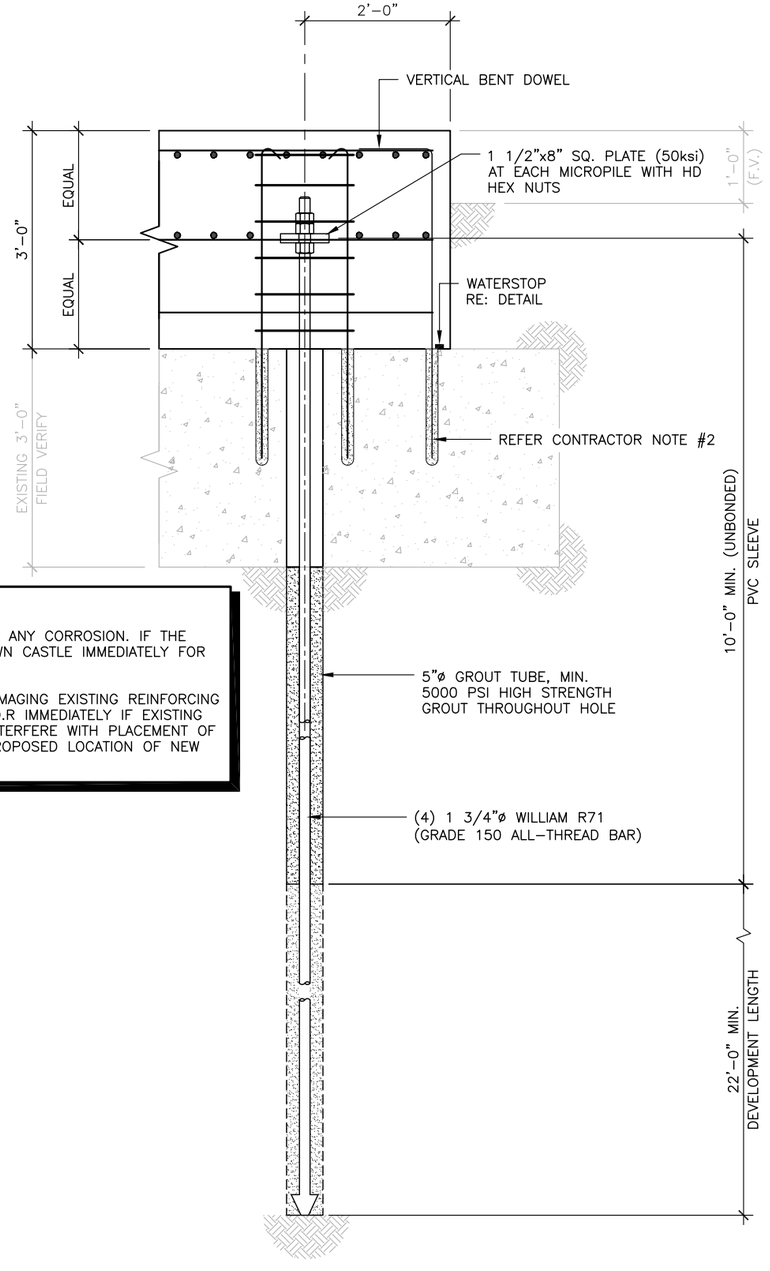
1 FOUNDATION SECTION
SCALE: N.T.S.

CONTRACTORS NOTE:

1. FIELD VERIFY THE EXISTING STEEL PLATES FOR ANY CORROSION. IF THE CORROSION IS FOUND, NOTIFY E.O.R. OF CROWN CASTLE IMMEDIATELY FOR APPROPRIATE REMEDIAL MEASURES.
2. TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING CORING OPERATIONS. NOTIFY E.O.R IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW BENT REBARS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW REBARS MAY BE REQUIRED.



3 FOUNDATION SECTION
SCALE: N.T.S.



2 FOUNDATION SECTION
SCALE: N.T.S.

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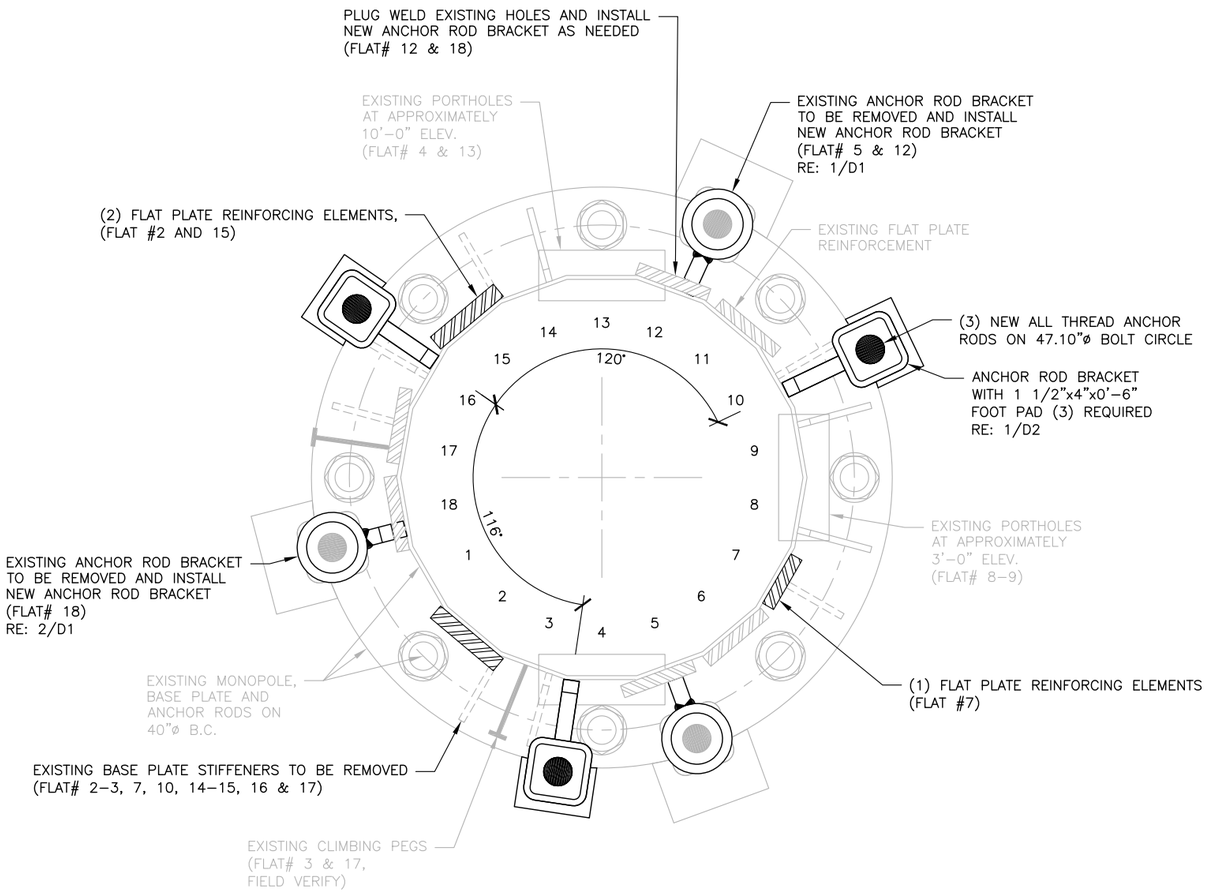
SHEET TITLE

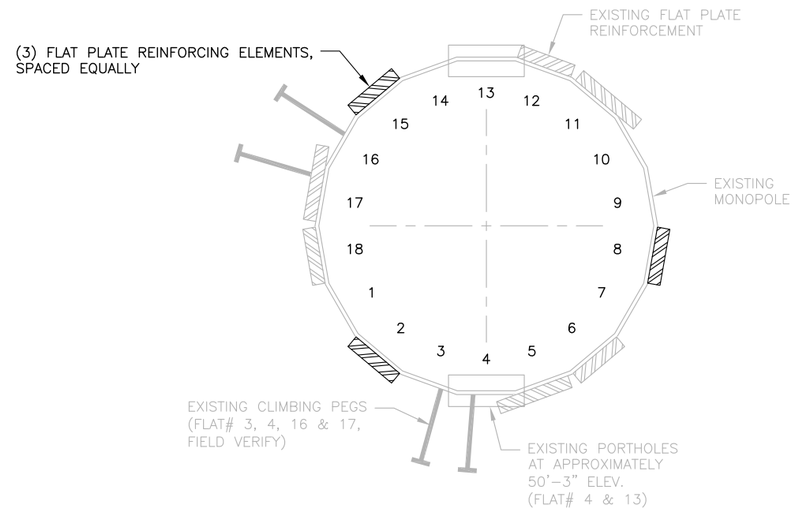
FOUNDATION SECTION

SHEET NUMBER: S10

REVISION: 0



1 TOWER SECTION (0'-30.5')
SCALE: N.T.S.



2 TOWER SECTION (25.58'-55.58')
SCALE: N.T.S.

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SUITE 300
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PH: (918) 587-4630
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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	01/18/19	ISSUED FOR CONSTRUCTION

PROJECT NO:	127643.004.01
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20

STATE OF CONNECTICUT
SCOTT S. KELLOGG
31627
LICENSED PROFESSIONAL ENGINEER
6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

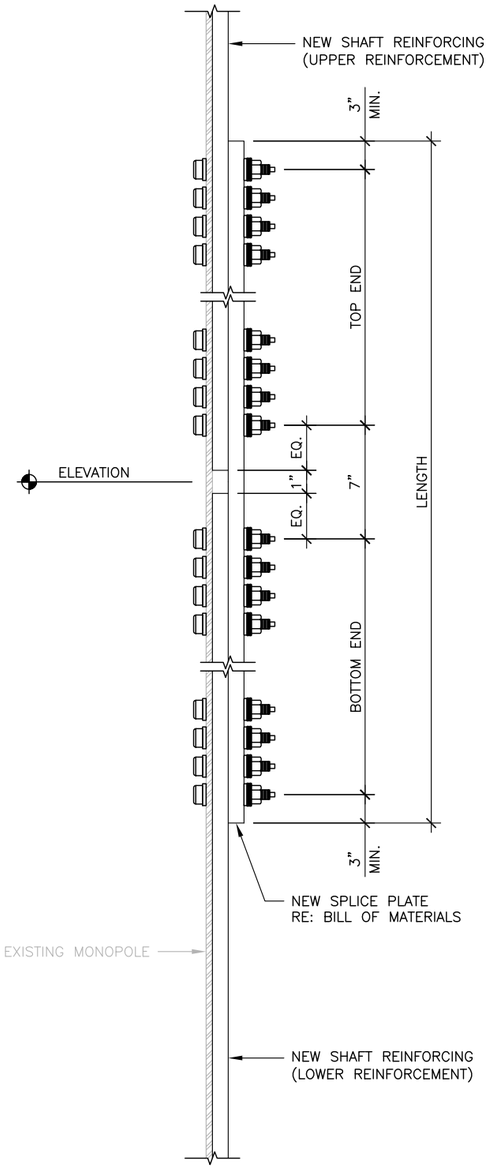
EXISTING 98' MONOPOLE

SHEET TITLE

TOWER SECTIONS
(0'-30.5' AND 25.58'-55.58')

SHEET NUMBER: S11

REVISION: 0



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)									
ELEVATION	PART NUMBER	WIDTH	THICKNESS	LENGTH	QTY	BOLTS HOLES PER SPLICE	TOTAL BOLTS HOLES	TOTAL STEEL WEIGHT	
30'-6 1/2"	CCI-SP-045100-6-11	4 1/2"	1"	4'-10"	2	17	34	148	LBS.

(A) O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
(B) USE SHIM PLATES AS REQUIRED.
(C) NUMBER OF ADDITIONAL BOLTS ARE FOR SPLICING INTO EXISTING REINFORCEMENT.
(D) STEEL WEIGHT NOT INCLUDED IN S7 BILL OF MATERIALS.

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STATE OF CONNECTICUT
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6/13/19

(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

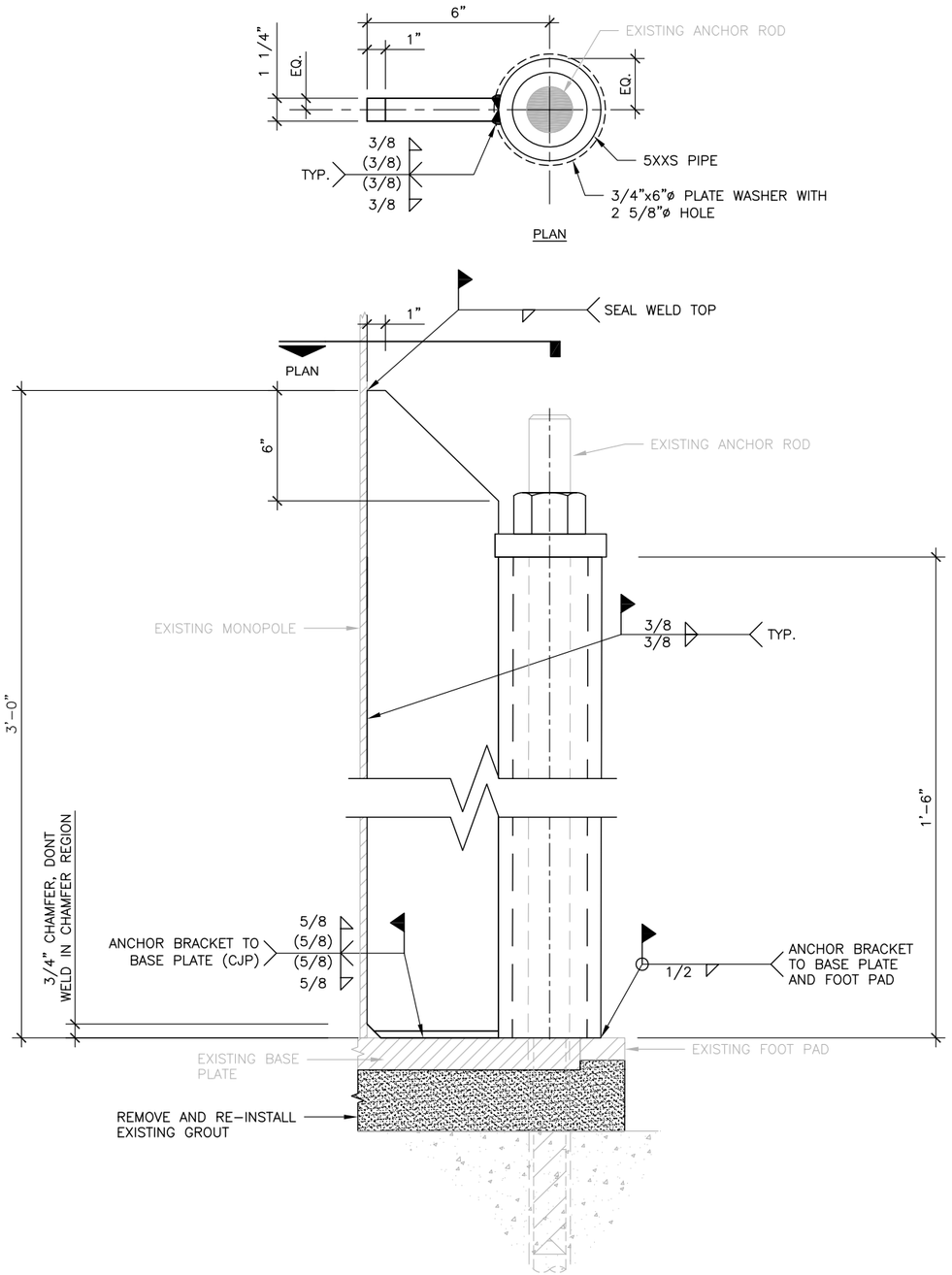
EXISTING 98' MONOPOLE

SHEET TITLE

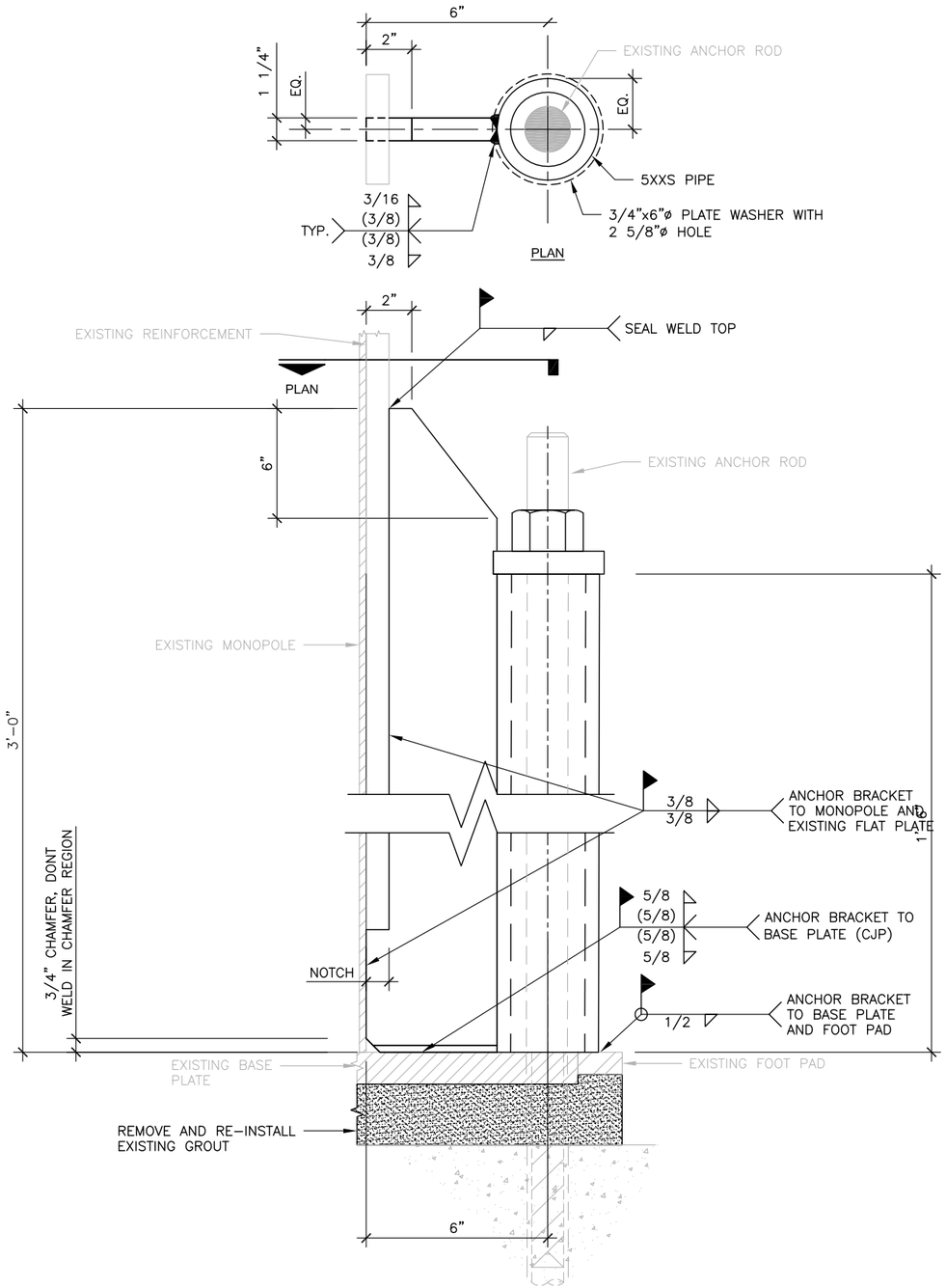
IN-LINE SPLICE DETAIL

SHEET NUMBER: S12

REVISION: 0



1 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.



2 ANCHOR ROD BRACKET DETAIL
SCALE: N.T.S.

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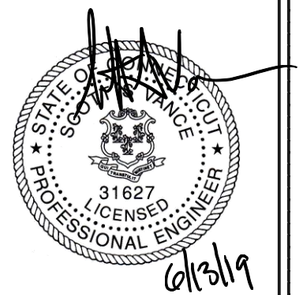
PROJECT ENG:	KISHORE MACHANI
DRAWN BY:	SDP / GLS
CHECKED BY:	US / SSC

B+T ENGINEERING, INC.
PEC.0001564
Expires 02/10/20



(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

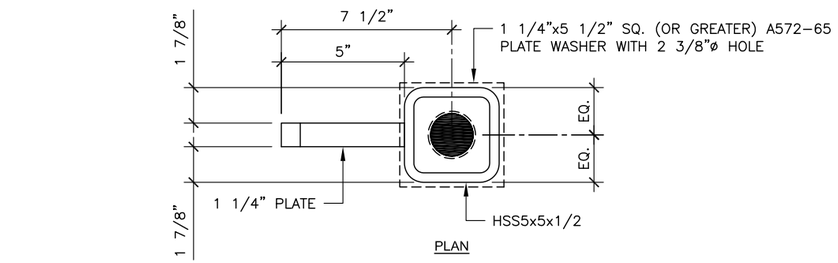
EXISTING 98' MONOPOLE

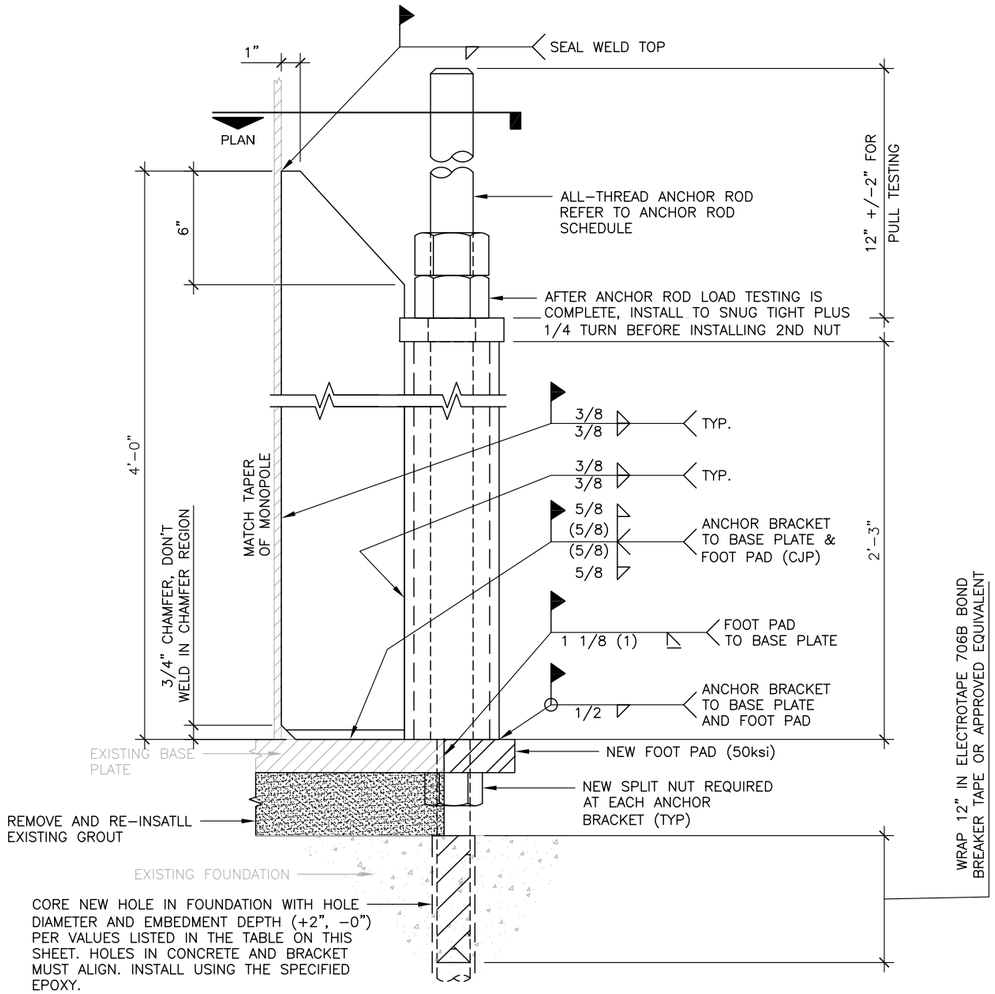
SHEET TITLE

ANCHOR ROD
BRACKET DETAILS

SHEET NUMBER:	REVISION:
D1	0

ANCHOR ROD SCHEDULE							
PART NUMBER	DIAMETER	LENGTH	MATERIALS	EMBEDMENT DEPTH	HOLE SIZE	EPOXY	TARGET TENSION
CCI–AR–0225	2 1/4"	8'–10"	A193–B7	5'–6"	2 1/2"	ALLFASTNERS AF35LV EPOXY GROUT	190





1 ANCHOR ROD BRACKET
SCALE: N.T.S.

ANCHOR ROD NOTES:

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.
2. REFERENCE CC APPROVED COMPONENTS (CURRENT VERISON) FOR ANCHOR ROD DIMENSIONS.
3. RODS MUST BE GALVANIZED FROM THE TOP OF THE PROJECTION TO 15" BELOW THE SURFACE OF THE CONCRETE, AT A MINIMUM.
4. CORED HOLES MUST BE MECHANICALLY ROUGHENED USING A CARBIDE HOLE ROUGHENER OR EQUIVALENT. BRUSHING WITH A NYLON OR WIRE BRUSH SHALL BE USED IN THE PROCESS OF HOLE CLEANING, BUT DOES NOT SATISFY THE HOLE ROUGHENING REQUIREMENT.
5. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS FOR HOLE CLEANING.
6. ALL HOLES MUST BE DRY PRIOR TO PLACING EPOXY.
7. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS REGARDING HANDLING OF THREADED ROD AND EPOXY, AS WELL AS ALL INSTALLATION INSTRUCTIONS AND REQUIREMENTS.
8. TAKE ALL MEASUREMENTS NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING CORING OPERATIONS. NOTIFY E.O.R. IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.
9. IF BASE PLATE GROUT REMOVAL IS REQUIRED FOR ANCHOR ROD INSTALLATION, SEE ENG–PRC–10012: BASE PLATE GROUT REPAIR, FOR PROCEDURES AND RECOMMENDED MANUFACTURERS. CONTRACTOR TO DETERMINE THE QUANTITY REQUIRED.
10. ONCE ALL RESIN AND GROUT HAVE CURED, NEW ANCHOR ROD REINFORCING SHALL BE TARGET TENSIONED TO THE VALUE LISTED IN THE TABLE ON THIS SHEET. SEE ENG–PRC–10119: PULL–OUT TESTING POST–INSTALLED ANCHOR RODS, FOR SPECIFICATIONS.
11. CONTRACTOR TO VERIFY THAT A PULL TEST IS ABLE TO BE PERFORMED USING THE ANCHOR ROD PRJECTION SHOWN.

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CROWN CASTLE

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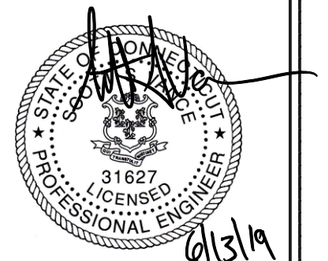


(F) E. GRANBY 4Q2000 / GALASSO
876399

60 SOUTH MAIN ST.
EAST GRANBY, CT

EXISTING 98' MONOPOLE

SHEET TITLE

ANCHOR ROD
BRACKET DETAIL

SHEET NUMBER:	REVISION:
D2	0

Exhibit E

Mount Analysis

Date: **April 5, 2019**

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

Maser Consulting Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
(732) 383-1950

Subject:	**Mount Analysis**	
Carrier Designation:	**T-Mobile Tower Equipment**	
	Carrier Site Number:	CT11542A
	Carrier Site Name:	E. Granby - Sprint
Crown Castle Designation:	**Crown Castle BU Number:**	876399
	Crown Castle Site Name:	(F) E. Grandby 4Q2000 Galasso
	Crown Castle JDE Job Number:	510433
	Crown Castle Order Number:	444519
Engineering Firm Designation:	**Maser Consulting Connecticut Report Designation:**	19922059A
Site Data:	**60 South Main St, East Granby, Hartford County, CT, 06026** **Latitude 41°56'29.59" Longitude -72°44'19.25"**	
Structure Information:	**Tower Height & Type:**	**98 ft Monopole**
	Mount Elevation:	**89 ft**
	Mount Type:	**12.5 ft Platform**

Dear Charles McGuirt,

Maser Consulting Connecticut is pleased to submit this **"Mount Analysis"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned 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.

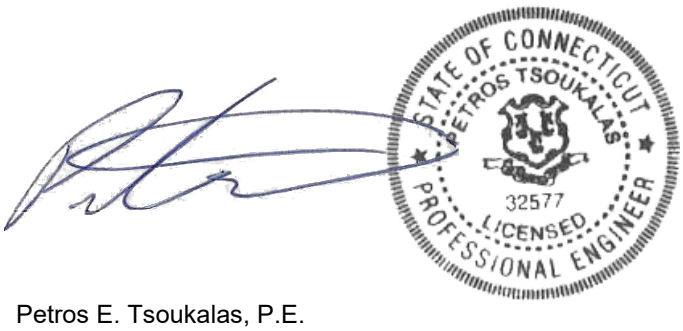
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform	**Sufficient**

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

Mount structural analysis prepared by: Nathaniel Ober, E.I.T.

Respectfully Submitted by:



Petros E. Tsoukalas, P.E.
Geographic Discipline Leader

TABLE OF CONTENTS

1) INTRODUCTION

This mount is an existing 12.5 ft Platform mapped by Tower Engineering Professionals.This mount is installed at the 89 ft elevation on 3 sector(s) of the 98 ft monopole**.**

2) ANALYSIS CRITERIA

Building Code:	2018 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Mean Base Elecation (AMSL):	255 ft
Topographic Factor:	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
89	90	3	RFS	APXV18-209014-C	Platform
			RFS	APXVAARR24_43-U-NA20	
			RFS	ATMPP1412D-1CWA	
			Ericsson	Radio 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Mapping	TEP# 61615.177487, Dated August 27, 2018	-	Maser Consulting

3.1) Analysis Method

RISA-3D, 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.The program performs design checks of structures under user specified loads. The user specified loads have been calculated separately based on the requirements of the above referenced codes. The program performs an analysis based on the steel code to determine the adequacy of the members and produces the reactions at the connection points of the mounts to the existing structure.

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.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision 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 Table 1 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.
4) The connection from the tower to the mount is in good condition and has been analyzed and found sufficient assuming it will achieve its theoretical strength.
5) Due to site specific analysis parameters, it is assumed that wind forces will control over seismic forces and as such, seismic forces have not been considered in this analysis.
6) Equipment installations are only conducted when the wind speed is less than 30 mph.
7) Proposed antennas are assumed to have associated equipment installed on the same mount pipe unless explicitly stated otherwise in the 'Recommendations' section of this report.
8) Proposed loading is assumed to be installed in the location shown in Appendix A of this report. Any changes made to the proposed loading location will render this report invalid.
9) All equipment model numbers, quantities, and centerline elevations are as provided in the application (Crown Castle Order #: 444519 Rev. 0, originally submitted 07/03/18)
10) If applicable, steel grades have been assumed as follows:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Bolts	ASTM A325
U-Bolts	SAE J429 GR 2
Threaded Rod	F1554 (GR 36)

Discrepancies between in-field conditions and the assumptions listed above may render this analysis invalid unless explicitly approved by Maser Consulting Connecticut Crown Castle should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3(a) - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Face Pipe	M5	90	22.7	Pass
1,3	Grating Plates	M22	90	75.5	Pass
1,3	Grating Angles	M12	90	10.4	Pass
2,3	Ring Plates	P21	90	26.1	Pass
1,3	Standoff Arm	M26	90	58.1	Pass
1,3	Antenna Pipes	M41	90	45.3	Pass
2,3	Connection to Tower		90	73.2	Pass

Structure Rating (max from all components) =	75.5%

Notes:
1) See additional documentation in "Appendix B – Software Input Calculations" for calculations supporting the % capacity consumed
2) See additional documentation in "Appendix C – Analysis Output" for calculations supporting the % capacity consumed
3) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed

4.1) Recommendations

The mount is sufficient for the proposed loads and does not requires modifications.

5) Disclaimer of Warranties

The engineering services rendered by Maser Consulting Connecticut. in connection with this structural analysis are limited to a computer analysis of the mounting frame structure and theoretical capacity of its main structural members. No allowance has been made for any damaged, bent, missing, loose, or rusted members or connections.

Maser Consulting Connecticut will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, or lack of maintenance. Maser Consulting Connecticut has performed a site visit at the aforementioned facility to verify member sizes and equipment loading. Contractor should inspect the condition of the existing structure, mounting frames and connections and notify Maser Consulting Connecticut of any discrepancies or deficiencies before proceeding with installation.

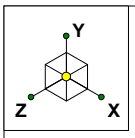
The attached sketch is a schematic representation of the analyzed mounting frames. The contractor shall be responsible for field verifying the existing conditions, proper fit, and clearances in the field. Any mention of structural modifications are reasonable estimates and should not be used as a construction document. Construction documents depicting the required modification are obtainable from Maser Consulting Connecticut, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable manufacturer.

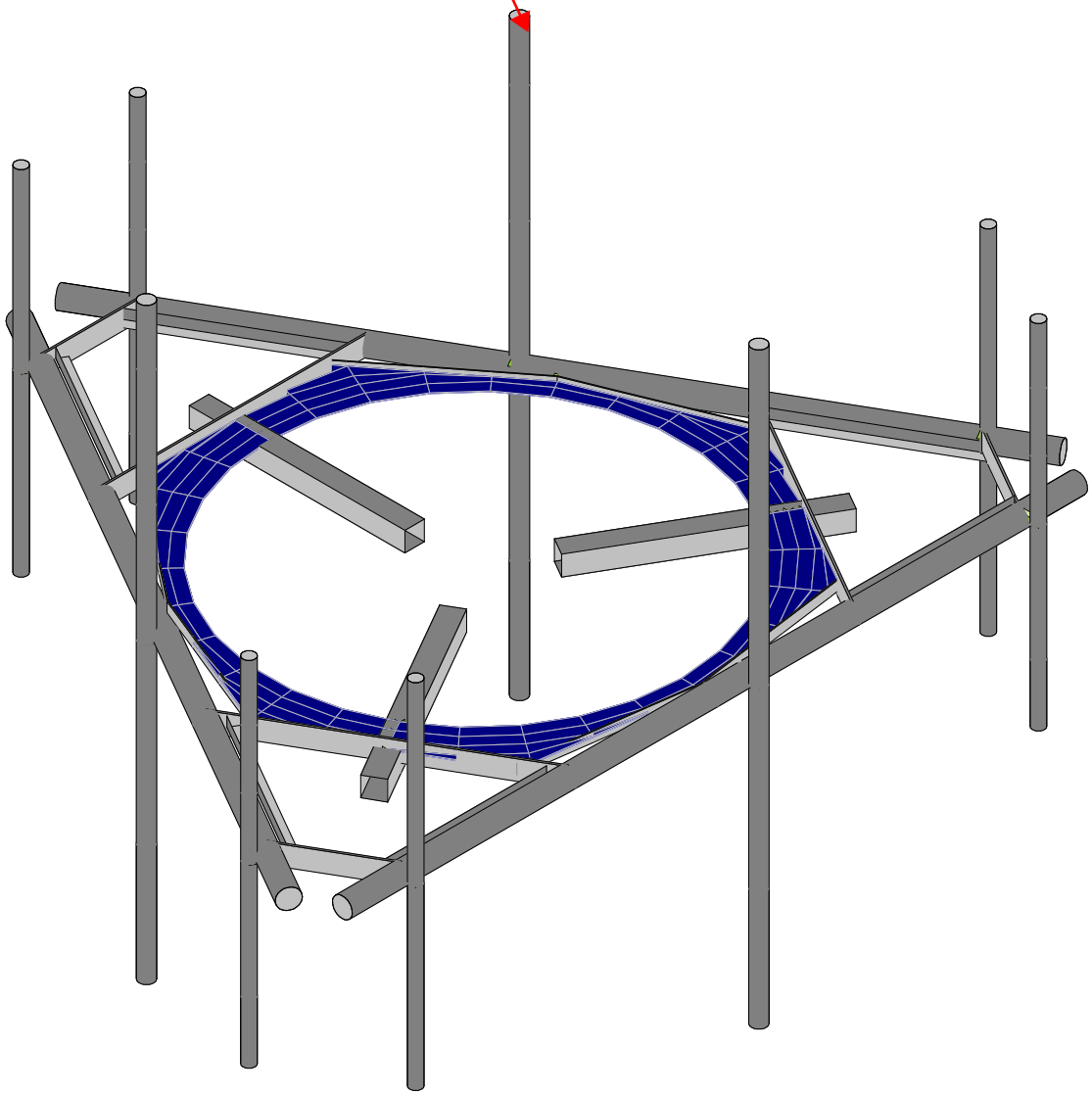
Maser Consulting Connecticut makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of the mounting frames. Maser Consulting Connecticut will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



PROPOSED APXVAARR24_43-U-NA20
RRUS 4449 B12 / B71
(TYP.)



Maser Consulting P.A.		
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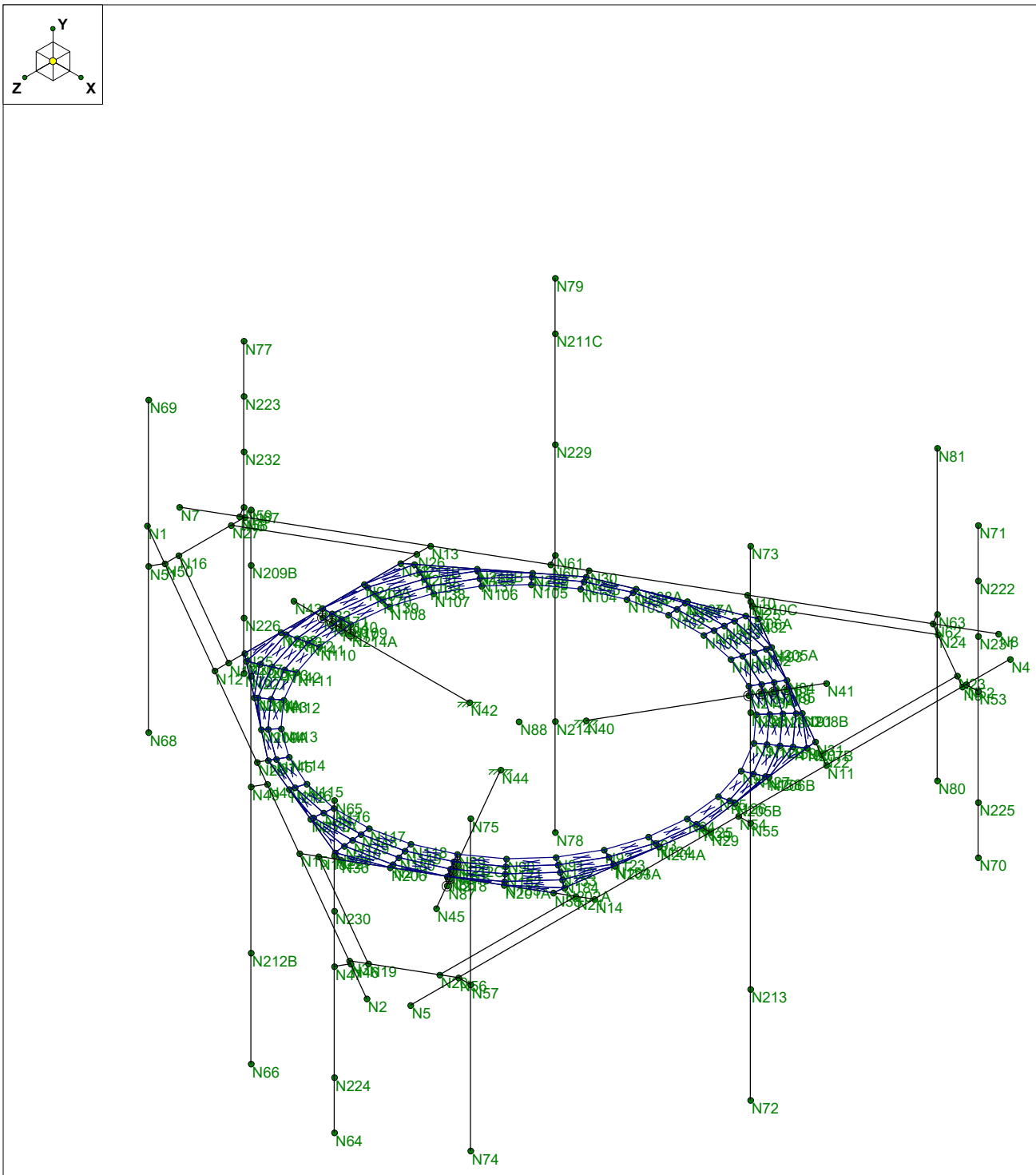
19922059A	Rendered	876399.R3D



Envelope Only Solution

Maser Consulting P.A.		
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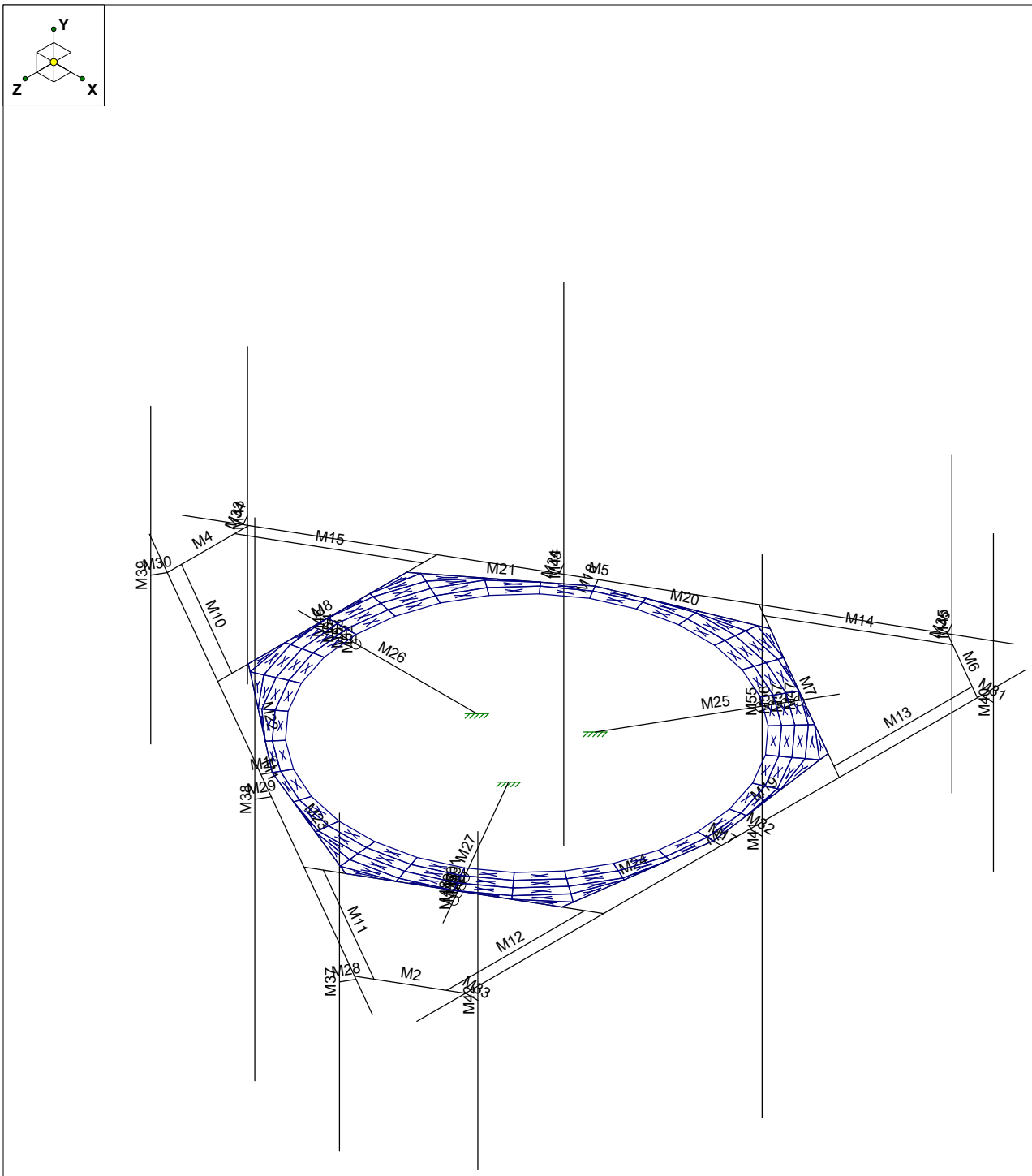
19922059A	Joint Labels	876399.R3D



Envelope Only Solution

Maser Consulting P.A.		
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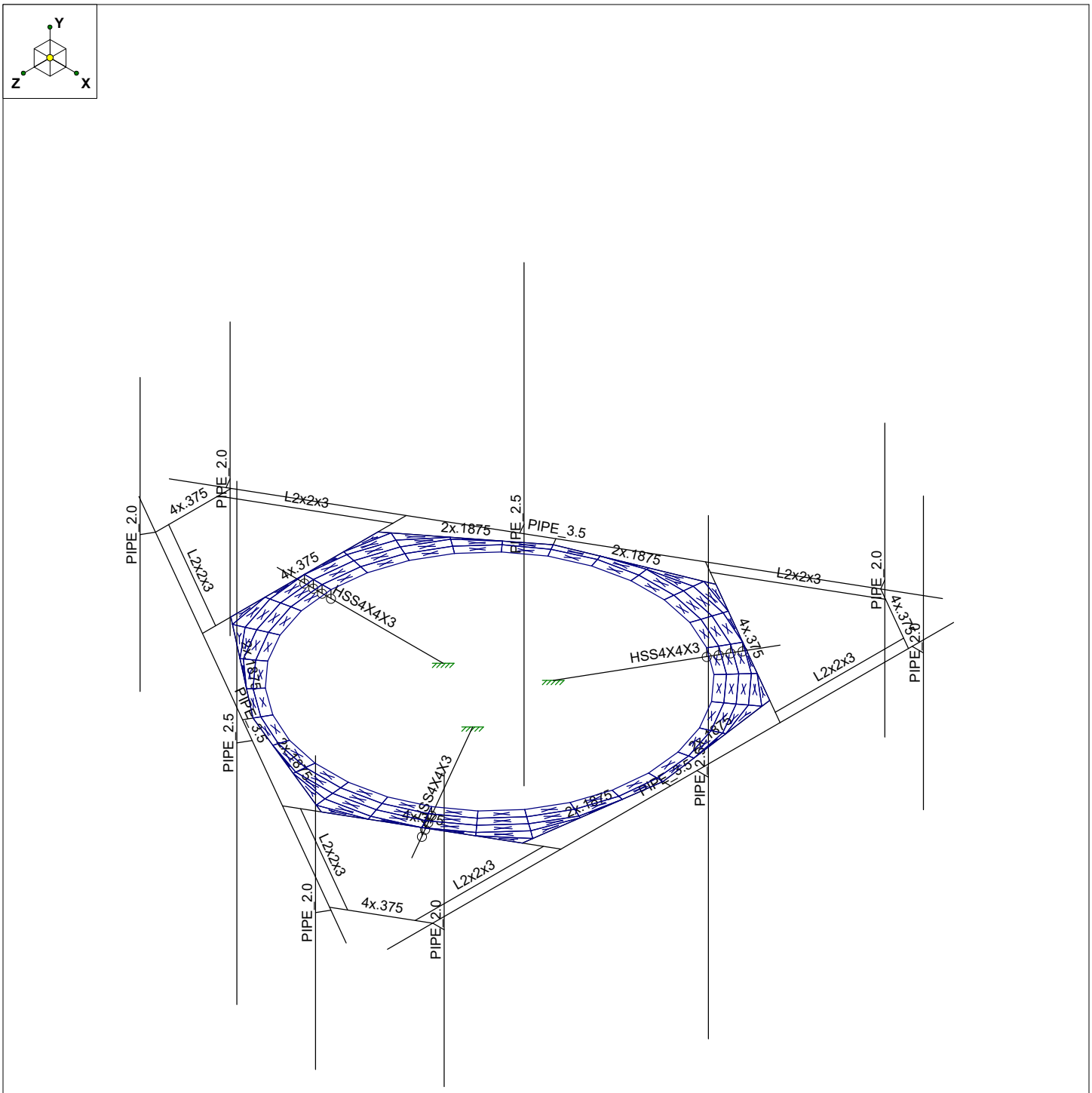
19922059A	Member Labels	876399.R3D



Envelope Only Solution

Maser Consulting P.A.		
NRO	Antenna Mount Analysis	Apr 5, 2019 at 11:12 AM
19922059A	Member Shape	876399.R3D

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Client:	TMobile	Computed By:	NRO
Site Name:	876339	Date:	4/5/2019
Project No.	19922059A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	1

Version 2.2

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	RFS	APXV18-209014-C	Existing	Alpha, Beta, & Gamma
3	**RFS**	**APXVAARR24_43-U-NA20**	**Proposed**	**Alpha, Beta, & Gamma**
3	RFS	ATMPP1412D-1CWA	Existing	Alpha, Beta, & Gamma
3	**ERICSSON**	**RRU 4449 B71 + B12**	**Proposed**	**Alpha, Beta, & Gamma**

Client:	TMobile	Computed By:	NRO
Site Name:	876339	Date:	4/5/2019
Project No.	19922059A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	2

I. DESIGN INPUTS

Calculations for gravity and lateral loading on equipment and support mounts are determined as per the ANSI/TIA-222-H Code

				Reference	Equation
Wind Load Inputs Parameters					
Antenna Centerline	z	90	ft		
Ultimate Wind Speed	V_u	120	mph		
Normal Wind Speed with Ice (3 sec. Gust):	V_i	50	mph	Figure B9, p. 238	
Maintenace Wind Speed:	V_s	30	mph	Section 2.8.3	
Design Ice Thickness	t_i	2.0	in	Figure B9, p. 238	
Surface Roughness:		C		Section 2.6.5.1.1	
Exposure Category:		C		Section 2.6.5.1.2	
Risk Category:		II		Table 2-1	
Rooftop Wind Speed-Up Factor	K_s	1.0		Section 2.6.7	
Ground Elevation:		255.0	ft		
Ground Elevation Factor:	K_e	0.99081		Table 2-6	
Gust Effect Factor:	G_h	1.00		Section 2.6.9	
Wind Directionality Factor:	K_d	0.95		Table 2-2	
Topographic Category:		1		Section 2.6.6.2	
Shielding Factor	K_a	0.9		Section 16.6	
Wind Load Coefficients					
Importance Factors:					
Iced:	I_{ice}	1		Table 2-3	
Exposure Category Coefficients:					
3-s Gust-Speed Power Law Exponent:	α	9.5		Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	900	ft	Table 2-4	
Min. Value for k_z:	Kz_{min}	0.85		Table 2-4	
Terrain Constant:	K_e	1.00		Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	1.238		Section 2.6.5.2	$=2.01 \cdot (z/z_g)^{2/\alpha'}$
Topographic Category Coefficients:					
Topographic Constant:	K_t	N/A		Table 2-5	
Height Attenuation Factor:	f	N/A		Table 2-5	
Height Reduction Factor:	K_h	N/A		Section 2.6.6.2.1	$=e^{(f \cdot z/H)}$
Topographic Factor:	K_{zt}	1.00		Section 2.6.6.2	$=[1+(K_c \cdot K_t/K_h)]^2$
Ice Accumulation:					
Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.11			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	2.21	in	Section 2.6.10	$=t_i \cdot I \cdot K_{iz} \cdot (K_{zt})^{0.35}$
Ice Density:	ρ_i	56.00	pcf		
Design Wind Pressures:					
Velocity Pressure:	q_z	38.66	psf	Section 2.6.11.6	$=0.00256 \cdot K_z \cdot K_{zt \cdot Ks \cdot Ke} \cdot K_d \cdot K_a \cdot V^2$
Velocity Pressure (With Ice):	q_{zi}	6.71	psf	Section 2.6.11.6	$=0.00256 \cdot K_z \cdot K_{zt \cdot Ks \cdot Ke} \cdot K_d \cdot K_a \cdot V_i^2$
Velocity Pressure (Maintenance):	q_{zm}	2.42	psf	Section 2.6.11.6	$=0.00256 \cdot K_z \cdot K_{zt \cdot Ks \cdot Ke} \cdot K_d \cdot K_a \cdot V_m^2$

II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	Non-Iced Condition								Iced Condition							
	Mounting Pipe			Equipment					Mounting Pipe			Equipment				
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$
APXV18-209014-C	72.0	2.375	1.200	53.00	6.65	3.15	1.43	1.73	76.4	6.8	0.894	57.42	11.07	7.57	1.32	1.42
APXVAARR24_43-U-NA20	120.0	2.375	1.200	95.90	24.00	8.70	1.27	1.53	124.4	6.8	1.051	100.32	28.42	13.12	1.25	1.42
ATMPP1412D-1CWA	0.0	0.000	0.000	13.80	8.70	3.10	1.20	1.29	0.0	0.0	0.000	18.22	13.12	7.52	1.20	1.20
RRU 4449 B71 + B12	0.0	0.000	0.000	14.95	13.19	9.25	1.20	1.20	0.0	0.0	0.000	19.37	17.61	13.67	1.20	1.20

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition			Iced Condition			Maintenance Condition	
		Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)	
		F_N	F_T		F_N	F_T		F_N	F_T
APXV18-209014-C	2	75.0	66.2	**13.1**	23.2	25.2	**61.8**	4.7	4.1
APXVAARR24_43-U-NA20	2	400.5	217.7	**76.7**	87.4	64.3	**313.2**	25.0	13.6
ATMPP1412D-1CWA	1	38.7	14.8	**12.5**	13.4	7.7	**47.0**	2.4	0.9
RRU 4449 B71 + B12	1	63.5	44.5	**83.0**	19.1	14.8	**79.9**	4.0	2.8

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition						Maintenance Condition
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
Pipe	Pipe 2.0	72	Round	2.38	1.20	9.18	6.80	6.80	76.42	1.20	4.56	12.39	0.57
Pipe	Pipe 2.5	120	Round	2.88	1.20	11.11	7.30	7.30	124.42	1.20	4.90	13.74	0.69
Pipe	Pipe 3.5	150	Round	4.00	1.20	15.46	8.42	8.42	154.42	1.20	5.65	16.78	0.97
Square HSS	HSS 4x4x3/16	44	HSS	4.00	1.06	13.72	8.42	8.42	48.42	1.06	5.01	21.25	0.86
Equal Angle	L2x2	34	Square	2.00	1.73	11.17	6.42	6.42	38.42	1.73	6.22	13.61	0.70
Solid Flat Bar	4X0.375	40	Square	4.00	1.50	19.33	8.42	4.42	44.42	1.50	7.07	16.78	1.21
Grating												20.64	(psf)

Client:	TMobile	Computed By:	NRO
Site Name:	876339	Date:	4/5/2019
Project No.	19922059A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	4

BASIC EQUATIONS

ANSI/TIA-222-H Reference

Force Coefficient: (Square) — Table 2-9

$$C_{f\_square}(h,w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Force Coefficient: (Round) — Table 2-9

$$C_{f\_round}(h,w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5}\cdot\left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18}\cdot\left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Terrain Exposure Constants: — Table 2-5

$$\alpha := \begin{cases} 7.0 & \text{if Exp = "B"} \\ 9.5 & \text{if Exp = "C"} \\ 11.5 & \text{if Exp = "D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if Exp = "B"} \\ 900\text{ft} & \text{if Exp = "C"} \\ 700\text{ft} & \text{if Exp = "D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if Exp = "B"} \\ 0.85 & \text{if Exp = "C"} \\ 1.03 & \text{if Exp = "D"} \end{cases}$$

Client:	TMobile	Computed By:	NRO
Site Name:	876339	Date:	4/5/2019
Project No.	19922059A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	5

BASIC EQUATIONS

ANSI/TIA-222-H Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

Section 2.6.5.6

$$K_z := Kz(z)$$

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{l} 1.0 \quad \text{if Topo = "1"} \\ \text{otherwise} \\ \quad \left| \begin{array}{l} K_e \leftarrow \left| \begin{array}{l} 0.90 \quad \text{if Exp = "B"} \\ 1.00 \quad \text{if Exp = "C"} \\ 1.10 \quad \text{if Exp = "D"} \end{array} \right. \\ K_t \leftarrow \left| \begin{array}{l} 0.43 \quad \text{if Topo = "2"} \\ 0.53 \quad \text{if Topo = "3"} \\ 0.72 \quad \text{if Topo = "4"} \end{array} \right. \\ f \leftarrow \left| \begin{array}{l} 1.25 \quad \text{if Topo = "2"} \\ 2.00 \quad \text{if Topo = "3"} \\ 1.50 \quad \text{if Topo = "4"} \end{array} \right. \\ K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} \\ \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 \end{array} \right. \end{array} \right.$$

Table 2-4

$$K_{zt} := Kzt(z)$$

Velocity Pressure:

$$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_s \cdot K_e \cdot K_d \cdot V^2 \cdot psf$$

Section 2.6.9.6

Client:	TMobile	Computed By:	NRO
Site Name:	876339	Date:	4/5/2019
Project No.	19922059A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	6

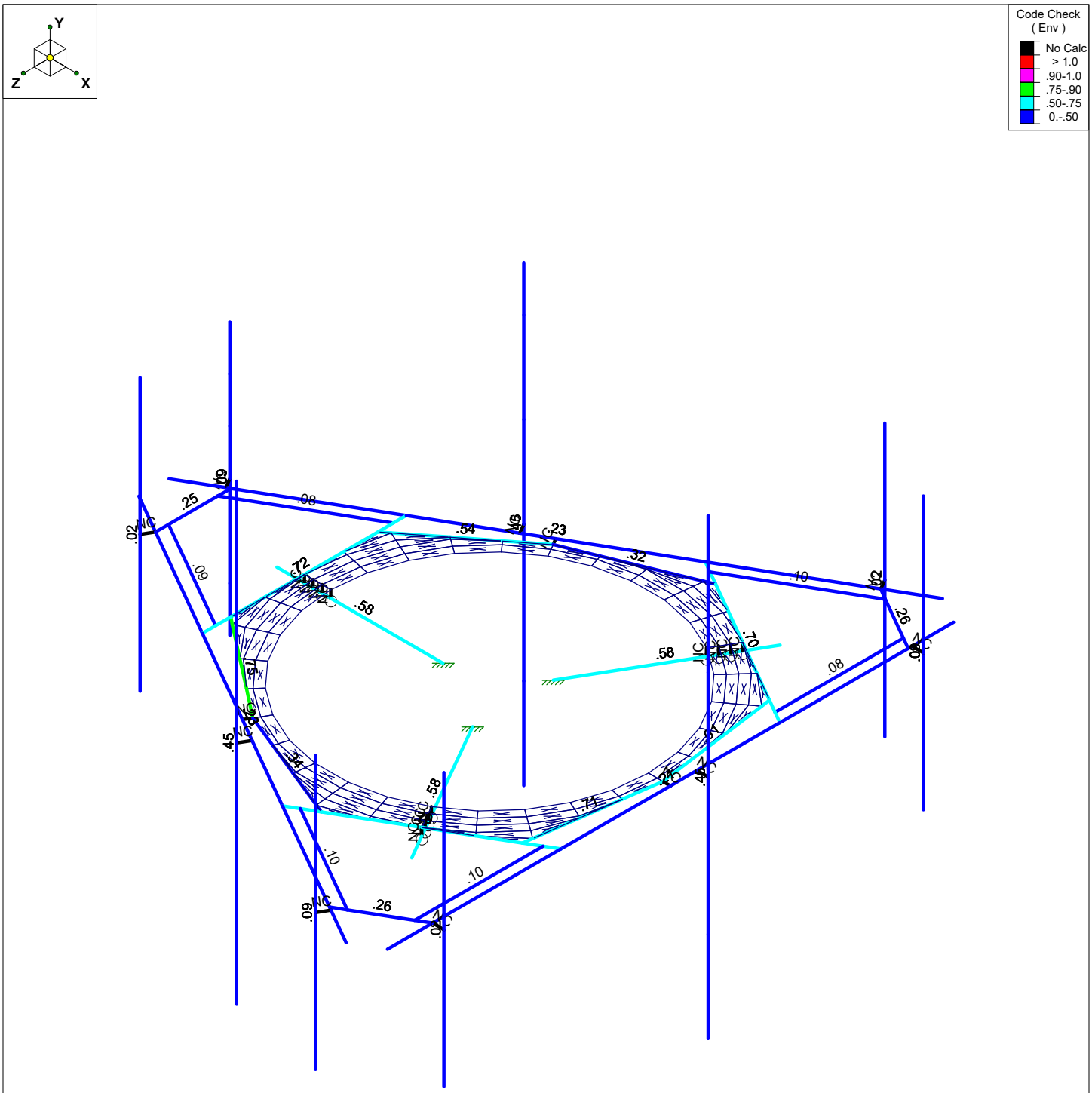
LOAD EQUATIONS

WIND LOAD

Area (Normal):	$AN_{area} = H_{ant} \cdot Want$
Area (Side):	$AT_{area} = H_{ant} \cdot Dant$
Force Coefficient (Normal):	$C_{fn} = C_{fsquare}(H_{ant}, Want)$
Force Coefficient (Side):	$C_{fs} = C_{fsquare}(H_{ant}, Dant)$
Pipe Area (Normal):	$AN_p = \max[(L_p - H_{ant}) * Dp, 0]$
Pipe Area (Side):	$AT_p = L_p \cdot Dp$
Force Coefficient (Normal):	$C_{fp} = C_{fround}(Lp, Dp)$
Normal Effective Projected Area:	$E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$
Side Effective Projected Area:	$E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$
Effective Projected Area:	$EPA = max(E_{pan}, Epat)$
Wind Force:	$F_{ant} = q_z \cdot Gh \cdot EPA$

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Maser Consulting P.A.		
NRO	Antenna Mount Analysis	Apr 5, 2019 at 11:08 AM
19922059A	Unity Bending	876399.R3D

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			Face Pipe	Beam	Pipe	A53 Gr. B	Typical
2	M2	N3	N56			Grating Plates	Beam	BAR	A36 Gr.36	Typical
3	M3	N4	N5			Face Pipe	Beam	Pipe	A53 Gr. B	Typical
4	M4	N50	N6			Grating Plates	Beam	BAR	A36 Gr.36	Typical
5	M5	N7	N8			Face Pipe	Beam	Pipe	A53 Gr. B	Typical
6	M6	N9	N62			Grating Plates	Beam	BAR	A36 Gr.36	Typical
7	M7	N10	N11			Grating Plates	Beam	BAR	A36 Gr.36	Typical
8	M8	N12	N13			Grating Plates	Beam	BAR	A36 Gr.36	Typical
9	M9	N14	N15			Grating Plates	Beam	BAR	A36 Gr.36	Typical
10	M10	N16	N17		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
11	M11	N18	N19		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
12	M12	N20	N21		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N22	N23		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
14	M14	N24	N25		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
15	M15	N26	N27		270	Grating Angles	Beam	Single Angle	A36 Gr.36	Typical
16	M16	N28	N37			RIGID	None	None	RIGID	Typical
17	M17	N29	N39			RIGID	None	None	RIGID	Typical
18	M18	N30	N34			RIGID	None	None	RIGID	Typical
19	M19	N31	N39			Ring Plates	Beam	BAR	A36 Gr.36	Typical
20	M20	N32	N34			Ring Plates	Beam	BAR	A36 Gr.36	Typical
21	M21	N33	N34			Ring Plates	Beam	BAR	A36 Gr.36	Typical
22	M22	N35	N37			Ring Plates	Beam	BAR	A36 Gr.36	Typical
23	M23	N36	N37			Ring Plates	Beam	BAR	A36 Gr.36	Typical
24	M24	N38	N39			Ring Plates	Beam	BAR	A36 Gr.36	Typical
25	M25	N40	N41			Standoff Arm	Beam	SquareTube	A500 Gr.46	Typical
26	M26	N42	N43			Standoff Arm	Beam	SquareTube	A500 Gr.46	Typical
27	M27	N44	N45			Standoff Arm	Beam	SquareTube	A500 Gr.46	Typical
28	M28	N46	N47			RIGID	None	None	RIGID	Typical
29	M29	N48	N49			RIGID	None	None	RIGID	Typical
30	M30	N50	N51			RIGID	None	None	RIGID	Typical
31	M31	N52	N53			RIGID	None	None	RIGID	Typical
32	M32	N54	N55			RIGID	None	None	RIGID	Typical
33	M33	N56	N57			RIGID	None	None	RIGID	Typical
34	M34	N58	N59			RIGID	None	None	RIGID	Typical
35	M35	N60	N61			RIGID	None	None	RIGID	Typical
36	M36	N62	N63			RIGID	None	None	RIGID	Typical
37	M37	N64	N65			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
38	M38	N66	N67			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
39	M39	N68	N69			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
40	M40	N70	N71			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
41	M41	N72	N73			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
42	M42	N74	N75			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
43	M43	N76	N77			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
44	M44	N78	N79			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
45	M45	N80	N81			Antenna Pipes...	Beam	Pipe	A53 Gr. B	Typical
46	M46	N82	N83			RIGID	None	None	RIGID	Typical
47	M47	N84	N85			RIGID	None	None	RIGID	Typical
48	M48	N86	N87			RIGID	None	None	RIGID	Typical
49	M49	N218	N151			RIGID	None	None	RIGID	Typical
50	M50	N215	N120			RIGID	None	None	RIGID	Typical
51	M51	N212C	N89			RIGID	None	None	RIGID	Typical
52	M52	N214A	N109			RIGID	None	None	RIGID	Typical
53	M53	N217	N140			RIGID	None	None	RIGID	Typical
54	M54	N220	N171			RIGID	None	None	RIGID	Typical
55	M55	N213A	N99			RIGID	None	None	RIGID	Typical
56	M56	N216	N130			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
57	M57	N219	N161			RIGID	None	None	RIGID	Typical

Plate Primary Data

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
1	P1	N89	N90	N121	N120	gen_Steel	.188
2	P2	N90	N91	N122	N121	gen_Steel	.188
3	P3	N91	N92	N123	N122	gen_Steel	.188
4	P4	N92	N93	N124	N123	gen_Steel	.188
5	P5	N93	N94	N125	N124	gen_Steel	.188
6	P6	N94	N95	N126	N125	gen_Steel	.188
7	P7	N95	N96	N127	N126	gen_Steel	.188
8	P8	N96	N97	N128	N127	gen_Steel	.188
9	P9	N97	N98	N129	N128	gen_Steel	.188
10	P10	N98	N99	N130	N129	gen_Steel	.188
11	P11	N99	N100	N131	N130	gen_Steel	.188
12	P12	N100	N101	N132	N131	gen_Steel	.188
13	P13	N101	N102	N133	N132	gen_Steel	.188
14	P14	N102	N103	N134	N133	gen_Steel	.188
15	P15	N103	N104	N135	N134	gen_Steel	.188
16	P16	N104	N105	N136	N135	gen_Steel	.188
17	P17	N105	N106	N137	N136	gen_Steel	.188
18	P18	N106	N107	N138	N137	gen_Steel	.188
19	P19	N107	N108	N139	N138	gen_Steel	.188
20	P20	N108	N109	N140	N139	gen_Steel	.188
21	P21	N109	N110	N141	N140	gen_Steel	.188
22	P22	N110	N111	N142	N141	gen_Steel	.188
23	P23	N111	N112	N143	N142	gen_Steel	.188
24	P24	N112	N113	N144	N143	gen_Steel	.188
25	P25	N113	N114	N145	N144	gen_Steel	.188
26	P26	N114	N115	N146	N145	gen_Steel	.188
27	P27	N115	N116	N147	N146	gen_Steel	.188
28	P28	N116	N117	N148	N147	gen_Steel	.188
29	P29	N117	N118	N149	N148	gen_Steel	.188
30	P30	N118	N89	N120	N149	gen_Steel	.188
31	P31	N120	N121	N152	N151	gen_Steel	.188
32	P32	N121	N122	N153	N152	gen_Steel	.188
33	P33	N122	N123	N154	N153	gen_Steel	.188
34	P38	N127	N128	N159	N158	gen_Steel	.188
35	P39	N128	N129	N160	N159	gen_Steel	.188
36	P40	N129	N130	N161	N160	gen_Steel	.188
37	P41	N130	N131	N162	N161	gen_Steel	.188
38	P42	N131	N132	N163	N162	gen_Steel	.188
39	P43	N132	N133	N164	N163	gen_Steel	.188
40	P48	N137	N138	N169	N168	gen_Steel	.188
41	P49	N138	N139	N170	N169	gen_Steel	.188
42	P50	N139	N140	N171	N170	gen_Steel	.188
43	P51	N140	N141	N172	N171	gen_Steel	.188
44	P52	N141	N142	N173	N172	gen_Steel	.188
45	P53	N142	N143	N174	N173	gen_Steel	.188
46	P58	N147	N148	N179	N178	gen_Steel	.188
47	P59	N148	N149	N180	N179	gen_Steel	.188
48	P60	N149	N120	N151	N180	gen_Steel	.188
49	P61	N151	N152	N183	N86	gen_Steel	.188
50	P62	N152	N153	N184	N183	gen_Steel	.188
51	P69	N159	N160	N191	N190	gen_Steel	.188

Plate Primary Data (Continued)

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
52	P70	N160	N161	N84	N191	gen_Steel	.188
53	P71	N161	N162	N193	N84	gen_Steel	.188
54	P72	N162	N163	N194	N193	gen_Steel	.188
55	P79	N169	N170	N201	N200	gen_Steel	.188
56	P80	N170	N171	N82	N201	gen_Steel	.188
57	P81	N171	N172	N203	N82	gen_Steel	.188
58	P82	N172	N173	N204	N203	gen_Steel	.188
59	P89	N179	N180	N211	N210	gen_Steel	.188
60	P90	N180	N151	N86	N211	gen_Steel	.188
61	P81A	N179	N210	N211A	N178	gen_Steel	.188
62	P82A	N178	N211A	N212		gen_Steel	.188
63	P83	N147	N178	N212	N146	gen_Steel	.188
64	P84	N146	N212	N37	N145	gen_Steel	.188
65	P85	N37	N209A	N144	N145	gen_Steel	.188
66	P86	N209A	N174	N143	N144	gen_Steel	.188
67	P87	N209A	N210A	N174		gen_Steel	.188
68	P88	N210A	N204	N173	N174	gen_Steel	.188
69	P89A	N86	N211	N206		gen_Steel	.188
70	P92	N210	N211A	N205		gen_Steel	.188
71	P91	N210	N211	N206	N205	gen_Steel	.188
72	P92A	N205	N36	N206		gen_Steel	.188
73	P93	N82	N203	N208		gen_Steel	.188
74	P94	N203	N204	N207	N208	gen_Steel	.188
75	P95	N204	N210A	N207		gen_Steel	.188
76	P96	N208	N207	N35		gen_Steel	.188
77	P77	N84	N193	N205A		gen_Steel	.188
78	P78	N193	N194	N206A	N205A	gen_Steel	.188
79	P79A	N205A	N206A	N32		gen_Steel	.188
80	P80A	N194	N163	N164		gen_Steel	.188
81	P81B	N206A	N194	N164	N207A	gen_Steel	.188
82	P82B	N133	N134	N208A	N164	gen_Steel	.188
83	P83A	N207A	N164	N208A		gen_Steel	.188
84	P84A	N134	N135	N34	N208A	gen_Steel	.188
85	P85A	N135	N136	N209	N34	gen_Steel	.188
86	P86A	N136	N137	N168	N209	gen_Steel	.188
87	P87A	N209	N168	N210B		gen_Steel	.188
88	P88A	N168	N169	N200	N210B	gen_Steel	.188
89	P89B	N210B	N200	N211B		gen_Steel	.188
90	P90A	N200	N201	N212A	N211B	gen_Steel	.188
91	P91A	N211B	N212A	N33		gen_Steel	.188
92	P92B	N201	N82	N212A		gen_Steel	.188
93	P93A	N84	N191	N208B		gen_Steel	.188
94	P94A	N191	N208B	N207B	N190	gen_Steel	.188
95	P95A	N208B	N31	N207B		gen_Steel	.188
96	P96A	N207B	N206B	N190		gen_Steel	.188
97	P97	N159	N190	N206B	N158	gen_Steel	.188
98	P98	N158	N206B	N205B		gen_Steel	.188
99	P99	N127	N158	N205B	N126	gen_Steel	.188
100	P100	N126	N205B	N39	N125	gen_Steel	.188
101	P101	N39	N204A	N124	N125	gen_Steel	.188
102	P102	N204A	N154	N123	N124	gen_Steel	.188
103	P103	N204A	N203A	N154		gen_Steel	.188
104	P104	N203A	N202A	N184		gen_Steel	.188
105	P105	N154	N203A	N184	N153	gen_Steel	.188
106	P106	N184	N202A	N201A	N183	gen_Steel	.188
107	P107	N202A	N38	N201A		gen_Steel	.188
108	P108	N183	N201A	N86		gen_Steel	.188

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	Y	-76.7
2	N213	L	Y	-76.7
3	N222	L	Y	-13.1
4	N225	L	Y	-13.1
5	N228	L	Y	-78
6	N231	L	Y	-12.5
7	N209B	L	Y	-76.7
8	N211C	L	Y	-76.7
9	N212B	L	Y	-76.7
10	N214	L	Y	-76.7
11	N221	L	Y	-13.1
12	N223	L	Y	-13.1
13	N224	L	Y	-13.1
14	N226	L	Y	-13.1
15	N227	L	Y	-78
16	N229	L	Y	-78
17	N230	L	Y	-12.5
18	N232	L	Y	-12.5

Joint Loads and Enforced Displacements (BLC 2 : Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	X	400.498
2	N213	L	X	400.498
3	N222	L	X	75.015
4	N225	L	X	75.015
5	N231	L	X	9.074
6	N209B	L	X	217.767
7	N211C	L	X	217.767
8	N212B	L	X	217.767
9	N214	L	X	217.767
10	N221	L	X	66.3
11	N223	L	X	66.3
12	N224	L	X	66.3
13	N226	L	X	66.3
14	N227	L	X	44.65
15	N229	L	X	44.65
16	N230	L	X	14.823
17	N232	L	X	14.823

Joint Loads and Enforced Displacements (BLC 3 : Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	Z	217.767
2	N213	L	Z	217.767
3	N222	L	Z	66.3
4	N225	L	Z	66.3
5	N228	L	Z	44.65
6	N231	L	Z	14.823
7	N209B	L	Z	400.498
8	N211C	L	Z	400.498
9	N212B	L	Z	400.498
10	N214	L	Z	400.498
11	N221	L	Z	75.015
12	N223	L	Z	75.015
13	N224	L	Z	75.015
14	N226	L	Z	75.015

Joint Loads and Enforced Displacements (BLC 3 : Wz) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
15	N230	L	Z	9.074
16	N232	L	Z	9.074

Joint Loads and Enforced Displacements (BLC 4 : Ice Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	X	87.412
2	N213	L	X	87.412
3	N222	L	X	23.178
4	N225	L	X	23.178
5	N231	L	X	2.066
6	N209B	L	X	64.324
7	N211C	L	X	64.324
8	N212B	L	X	64.324
9	N214	L	X	64.324
10	N221	L	X	25.244
11	N223	L	X	25.244
12	N224	L	X	25.244
13	N226	L	X	25.244
14	N227	L	X	14.823
15	N229	L	X	14.823
16	N230	L	X	7.636
17	N232	L	X	7.636

Joint Loads and Enforced Displacements (BLC 5 : Ice Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	Z	64.324
2	N213	L	Z	64.324
3	N222	L	Z	25.244
4	N225	L	Z	25.244
5	N228	L	Z	14.823
6	N231	L	Z	7.636
7	N209B	L	Z	87.412
8	N211C	L	Z	87.412
9	N212B	L	Z	87.412
10	N214	L	Z	87.412
11	N221	L	Z	23.178
12	N223	L	Z	23.178
13	N224	L	Z	23.178
14	N226	L	Z	23.178
15	N230	L	Z	2.066
16	N232	L	Z	2.066

Joint Loads and Enforced Displacements (BLC 6 : Ice weight)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	Y	-313.2
2	N213	L	Y	-313.2
3	N222	L	Y	-61.8
4	N225	L	Y	-61.8
5	N228	L	Y	-79.9
6	N231	L	Y	-47
7	N209B	L	Y	-313.2
8	N211C	L	Y	-313.2
9	N212B	L	Y	-313.2
10	N214	L	Y	-313.2
11	N221	L	Y	-61.8

Joint Loads and Enforced Displacements (BLC 6 : Ice weight) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
12	N223	L	Y	-61.8
13	N224	L	Y	-61.8
14	N226	L	Y	-61.8
15	N227	L	Y	-79.9
16	N229	L	Y	-79.9
17	N230	L	Y	-47
18	N232	L	Y	-47

Joint Loads and Enforced Displacements (BLC 7 : Service X)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	X	25.065
2	N213	L	X	25.065
3	N222	L	X	4.672
4	N225	L	X	4.672
5	N231	L	X	.539
6	N209B	L	X	13.566
7	N211C	L	X	13.566
8	N212B	L	X	13.566
9	N214	L	X	13.566
10	N221	L	X	4.133
11	N223	L	X	4.133
12	N224	L	X	4.133
13	N226	L	X	4.133
14	N227	L	X	2.785
15	N229	L	X	2.785
16	N230	L	X	4.133
17	N232	L	X	4.133

Joint Loads and Enforced Displacements (BLC 8 : Service Z)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N210C	L	Z	13.566
2	N213	L	Z	13.566
3	N222	L	Z	4.133
4	N225	L	Z	4.133
5	N228	L	Z	2.785
6	N231	L	Z	.898
7	N209B	L	Z	25.065
8	N211C	L	Z	25.065
9	N212B	L	Z	25.065
10	N214	L	Z	25.065
11	N221	L	Z	4.672
12	N223	L	Z	4.672
13	N224	L	Z	4.672
14	N226	L	Z	4.672
15	N230	L	Z	4.672
16	N232	L	Z	4.672

Joint Loads and Enforced Displacements (BLC 9 : Service 1 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N53	L	Y	-500

Joint Loads and Enforced Displacements (BLC 10 : Service 2 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N55	L	Y	-500

Joint Loads and Enforced Displacements (BLC 11 : Service 3 Pipe)

	Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
1	N57	L	Y	-500

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M2	PX	21.52	21.52	0	0
2	M4	PX	21.52	21.52	0	0
3	M6	PX	21.52	21.52	0	0

Member Distributed Loads (BLC 2 : Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PX	15.47	15.47	0	0
2	M3	PX	15.47	15.47	0	0
3	M5	PX	15.47	15.47	0	0
4	M25	PX	13.718	13.718	0	0
5	M26	PX	13.718	13.718	0	0
6	M27	PX	13.718	13.718	0	0
7	M39	PX	9.181	9.181	0	0
8	M42	PX	9.181	9.181	0	0
9	M45	PX	9.181	9.181	0	0

Member Distributed Loads (BLC 3 : Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PZ	15.47	15.47	0	0
2	M3	PZ	15.47	15.47	0	0
3	M5	PZ	15.47	15.47	0	0
4	M2	PZ	19.333	19.333	0	0
5	M4	PZ	19.333	19.333	0	0
6	M6	PZ	19.333	19.333	0	0
7	M25	PZ	13.718	13.718	0	0
8	M26	PZ	13.718	13.718	0	0
9	M27	PZ	13.718	13.718	0	0
10	M39	PZ	9.181	9.181	0	0
11	M42	PZ	9.181	9.181	0	0
12	M45	PZ	9.181	9.181	0	0

Member Distributed Loads (BLC 4 : Ice Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PX	5.651	5.651	0	0
2	M3	PX	5.651	5.651	0	0
3	M5	PX	5.651	5.651	0	0
4	M2	PX	7.07	7.07	0	0
5	M4	PX	7.07	7.07	0	0
6	M6	PX	7.07	7.07	0	0
7	M25	PX	5.013	5.013	0	0
8	M26	PX	5.013	5.013	0	0
9	M27	PX	5.013	5.013	0	0
10	M39	PX	4.564	4.564	0	0
11	M42	PX	4.564	4.564	0	0
12	M45	PX	4.564	4.564	0	0

Member Distributed Loads (BLC 5 : Ice Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PZ	5.651	5.651	0	0

Member Distributed Loads (BLC 5 : Ice Wz) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
2	M3	PZ	5.651	5.651	0	0
3	M5	PZ	5.651	5.651	0	0
4	M2	PZ	7.07	7.07	0	0
5	M4	PZ	7.07	7.07	0	0
6	M6	PZ	7.07	7.07	0	0
7	M25	PZ	5.013	5.013	0	0
8	M26	PZ	5.013	5.013	0	0
9	M27	PZ	5.013	5.013	0	0
10	M39	PZ	4.564	4.564	0	0
11	M42	PZ	4.564	4.564	0	0
12	M45	PZ	4.564	4.564	0	0

Member Distributed Loads (BLC 6 : Ice weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	Y	-16.78	-16.78	0	0
2	M3	Y	-16.78	-16.78	0	0
3	M5	Y	-16.78	-16.78	0	0
4	M25	Y	-21.25	-21.25	0	0
5	M26	Y	-21.25	-21.25	0	0
6	M27	Y	-21.25	-21.25	0	0
7	M37	Y	-12.39	-12.39	0	0
8	M39	Y	-12.39	-12.39	0	0
9	M40	Y	-12.39	-12.39	0	0
10	M42	Y	-12.39	-12.39	0	0
11	M43	Y	-12.39	-12.39	0	0
12	M45	Y	-12.39	-12.39	0	0
13	M38	Y	-13.74	-13.74	0	0
14	M41	Y	-13.74	-13.74	0	0
15	M44	Y	-13.74	-13.74	0	0

Member Distributed Loads (BLC 7 : Service X)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PX	.97	.97	0	0
2	M3	PX	.97	.97	0	0
3	M5	PX	.97	.97	0	0
4	M2	PX	1.204	1.204	0	0
5	M4	PX	1.204	1.204	0	0
6	M6	PX	1.204	1.204	0	0
7	M25	PX	.853	.853	0	0
8	M26	PX	.853	.853	0	0
9	M27	PX	.853	.853	0	0
10	M39	PX	.575	.575	0	0
11	M42	PX	.575	.575	0	0
12	M45	PX	.575	.575	0	0

Member Distributed Loads (BLC 8 : Service Z)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M1	PZ	.97	.97	0	0
2	M3	PZ	.97	.97	0	0
3	M5	PZ	.97	.97	0	0
4	M2	PZ	1.204	1.204	0	0
5	M4	PZ	1.204	1.204	0	0
6	M6	PZ	1.204	1.204	0	0
7	M25	PZ	.853	.853	0	0
8	M26	PZ	.853	.853	0	0

Member Distributed Loads (BLC 8 : Service Z) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
9	M27	PZ	.853	.853	0	0
10	M39	PZ	.575	.575	0	0
11	M42	PZ	.575	.575	0	0
12	M45	PZ	.575	.575	0	0

Member Distributed Loads (BLC 15 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M4	Y	-5.018	-5.018	1.888	18.273
2	M8	Y	-1.428	-7.721	0	24.3
3	M8	Y	-7.721	-14.014	24.3	48.6
4	M10	Y	-5.695	-5.695	1.272	26.091
5	M15	Y	-8.476	-8.476	13.49	29.899
6	M6	Y	-3.399	-3.399	5.559	17.559
7	M7	Y	-4.285	-6.349	0	27
8	M7	Y	-6.349	-8.413	27	54
9	M13	Y	-2.236	-7.475	10.2	22.1
10	M13	Y	-7.475	-12.714	22.1	34
11	M14	Y	-5.921	-7.408	0	11.9
12	M14	Y	-7.408	-8.895	11.9	23.8
13	M2	Y	-3.403	-3.403	2.444	14.444
14	M9	Y	-8.414	-6.348	0	27
15	M9	Y	-6.348	-4.283	27	54
16	M11	Y	-8.9	-7.41	10.2	22.1
17	M11	Y	-7.41	-5.919	22.1	34
18	M12	Y	-12.713	-7.474	0	11.9
19	M12	Y	-7.474	-2.235	11.9	23.8

Member Distributed Loads (BLC 16 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,...	End Magnitude[lb/ft,F,psf]	Start Location[in,%]	End Location[in,%]
1	M2	Y	-7.025	-7.025	2.444	14.444
2	M9	Y	-17.366	-13.103	0	27
3	M9	Y	-13.103	-8.841	27	54
4	M11	Y	-18.37	-15.294	10.2	22.1
5	M11	Y	-15.294	-12.218	22.1	34
6	M12	Y	-26.239	-15.426	0	11.9
7	M12	Y	-15.426	-4.612	11.9	23.8
8	M4	Y	-10.357	-10.357	1.888	18.273
9	M8	Y	-2.947	-15.936	0	24.3
10	M8	Y	-15.936	-28.925	24.3	48.6
11	M10	Y	-11.755	-11.755	1.272	26.091
12	M15	Y	-17.493	-17.493	13.49	29.899
13	M6	Y	-7.016	-7.016	5.559	17.559
14	M7	Y	-8.845	-13.105	0	27
15	M7	Y	-13.105	-17.365	27	54
16	M13	Y	-4.615	-15.429	10.2	22.1
17	M13	Y	-15.429	-26.242	22.1	34
18	M14	Y	-12.221	-15.29	0	11.9
19	M14	Y	-15.29	-18.36	11.9	23.8

Member Area Loads (BLC 1 : Dead)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N17	N16	N27	N26	Y	Two Way	-10
2	N22	N25	N24	N23	Y	Two Way	-10
3	N21	N20	N19	N18	Y	Two Way	-10

Member Area Loads (BLC 6 : Ice weight)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N21	N20	N19	N18	Y	Two Way	-20.64
2	N17	N16	N27	N26	Y	Two Way	-20.64
3	N22	N25	N24	N23	Y	Two Way	-20.64

Plate Surface Loads (BLC 6 : Ice weight)

	Plate Label	Direction	Magnitude[psf,F]
1	P1	Y	-20.64
2	P2	Y	-20.64
3	P3	Y	-20.64
4	P4	Y	-20.64
5	P5	Y	-20.64
6	P6	Y	-20.64
7	P7	Y	-20.64
8	P8	Y	-20.64
9	P9	Y	-20.64
10	P10	Y	-20.64
11	P11	Y	-20.64
12	P12	Y	-20.64
13	P13	Y	-20.64
14	P14	Y	-20.64
15	P15	Y	-20.64
16	P16	Y	-20.64
17	P17	Y	-20.64
18	P18	Y	-20.64
19	P19	Y	-20.64
20	P20	Y	-20.64
21	P21	Y	-20.64
22	P22	Y	-20.64
23	P23	Y	-20.64
24	P24	Y	-20.64
25	P25	Y	-20.64
26	P26	Y	-20.64
27	P27	Y	-20.64
28	P28	Y	-20.64
29	P29	Y	-20.64
30	P30	Y	-20.64
31	P31	Y	-20.64
32	P32	Y	-20.64
33	P33	Y	-20.64
34	P38	Y	-20.64
35	P39	Y	-20.64
36	P40	Y	-20.64
37	P41	Y	-20.64
38	P42	Y	-20.64
39	P43	Y	-20.64
40	P48	Y	-20.64
41	P49	Y	-20.64
42	P50	Y	-20.64
43	P51	Y	-20.64
44	P52	Y	-20.64
45	P53	Y	-20.64
46	P58	Y	-20.64
47	P59	Y	-20.64
48	P60	Y	-20.64
49	P61	Y	-20.64

Plate Surface Loads (BLC 6 : Ice weight) (Continued)

	Plate Label	Direction	Magnitude[psf,F]
50	P62	Y	-20.64
51	P69	Y	-20.64
52	P70	Y	-20.64
53	P71	Y	-20.64
54	P72	Y	-20.64
55	P79	Y	-20.64
56	P80	Y	-20.64
57	P81	Y	-20.64
58	P82	Y	-20.64
59	P89	Y	-20.64
60	P90	Y	-20.64
61	P81A	Y	-20.64
62	P82A	Y	-20.64
63	P83	Y	-20.64
64	P84	Y	-20.64
65	P85	Y	-20.64
66	P86	Y	-20.64
67	P87	Y	-20.64
68	P88	Y	-20.64
69	P89A	Y	-20.64
70	P92	Y	-20.64
71	P91	Y	-20.64
72	P92A	Y	-20.64
73	P93	Y	-20.64
74	P94	Y	-20.64
75	P95	Y	-20.64
76	P96	Y	-20.64
77	P77	Y	-20.64
78	P78	Y	-20.64
79	P79A	Y	-20.64
80	P80A	Y	-20.64
81	P81B	Y	-20.64
82	P82B	Y	-20.64
83	P83A	Y	-20.64
84	P84A	Y	-20.64
85	P85A	Y	-20.64
86	P86A	Y	-20.64
87	P87A	Y	-20.64
88	P88A	Y	-20.64
89	P89B	Y	-20.64
90	P90A	Y	-20.64
91	P91A	Y	-20.64
92	P92B	Y	-20.64
93	P93A	Y	-20.64
94	P94A	Y	-20.64
95	P95A	Y	-20.64
96	P96A	Y	-20.64
97	P97	Y	-20.64
98	P98	Y	-20.64
99	P99	Y	-20.64
100	P100	Y	-20.64
101	P101	Y	-20.64
102	P102	Y	-20.64
103	P103	Y	-20.64
104	P104	Y	-20.64
105	P105	Y	-20.64
106	P106	Y	-20.64

Plate Surface Loads (BLC 6 : Ice weight) (Continued)

	Plate Label	Direction	Magnitude[psf,F]
107	P107	Y	-20.64
108	P108	Y	-20.64

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	DL		-1.05		18		3	3	
2	Wx	WL				17		9		
3	Wz	WL				16		12		
4	Ice Wx	WL				17		12		
5	Ice Wz	WL				16		12		
6	Ice weight	DL				18		15	3	108
7	Service X	WL				17		12		
8	Service Z	WL				16		12		
9	Service 1 Pipe	OL1				1				
10	Service 2 Pipe	OL1				1				
11	Service 3 Pipe	OL1				1				
12	Service 4 Pipe	OL1								
13	Service 5 Middle	OL1					1			
14	Service 6 End	OL1					1			
15	BLC 1 Transient Ar...	None						19		
16	BLC 6 Transient Ar...	None						19		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4D	Yes	Y		1	1.4																		
2	1.2D+1.0W1	Yes	Y		1	1.2	2	1	3															
3	1.2D+1.0W2	Yes	Y		1	1.2	2	.866	3	.5														
4	1.2D+1.0W3	Yes	Y		1	1.2	2	.5	3	.866														
5	1.2D+1.0W4	Yes	Y		1	1.2	2		3	1														
6	1.2D+1.0W5	Yes	Y		1	1.2	2	-.5	3	.866														
7	1.2D+1.0W6	Yes	Y		1	1.2	2	-.866	3	.5														
8	1.2D+1.0W7	Yes	Y		1	1.2	2	-1	3															
9	1.2D+1.0W8	Yes	Y		1	1.2	2	-.866	3	-.5														
10	1.2D+1.0W9	Yes	Y		1	1.2	2	-.5	3	-.866														
11	1.2D+1.0W10	Yes	Y		1	1.2	2		3	-1														
12	1.2D+1.0W11	Yes	Y		1	1.2	2	.5	3	-.866														
13	1.2D+1.0W12	Yes	Y		1	1.2	2	.866	3	-.5														
14	1.2D+1.0 Ice	Yes	Y		1	1.2	6	1																
15	1.2D+1.0ICE+1.0W1ICE	Yes	Y		1	1.2	6	1	4	1	5													
16	1.2D+1.0ICE+1.0W2ICE	Yes	Y		1	1.2	6	1	4	.866	5	.5												
17	1.2D+1.0ICE+1.0W3ICE	Yes	Y		1	1.2	6	1	4	.5	5	.866												
18	1.2D+1.0ICE+1.0W4ICE	Yes	Y		1	1.2	6	1	4		5	1												
19	1.2D+1.0ICE+1.0W5ICE	Yes	Y		1	1.2	6	1	4	-.5	5	.866												
20	1.2D+1.0ICE+1.0W6ICE	Yes	Y		1	1.2	6	1	4	-.866	5	.5												
21	1.2D+1.0ICE+1.0W7ICE	Yes	Y		1	1.2	6	1	4	-1	5													
22	1.2D+1.0ICE+1.0W8ICE	Yes	Y		1	1.2	6	1	4	-.866	5	-.5												
23	1.2D+1.0ICE+1.0W9ICE	Yes	Y		1	1.2	6	1	4	-.5	5	-.866												
24	1.2D+1.0ICE+1.0W10ICE	Yes	Y		1	1.2	6	1	4		5	-1												
25	1.2D+1.0ICE+1.0W11ICE	Yes	Y		1	1.2	6	1	4	.5	5	-.866												
26	1.2D+1.0ICE+1.0W12ICE	Yes	Y		1	1.2	6	1	4	.866	5	-.5												
27	1.2D+1.5LM1+1.0W1SER	Yes	Y		1	1.2	9	1.5	7	1	8													
28	1.2D+1.5LM1+1.0W2SER	Yes	Y		1	1.2	9	1.5	7	.866	8	.5												
29	1.2D+1.5LM1+1.0W3SER	Yes	Y		1	1.2	9	1.5	7	.5	8	.866												
30	1.2D+1.5LM1+1.0W4SER	Yes	Y		1	1.2	9	1.5	7		8	1												

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
31	1.2D+1.5LM1+1.0W5SER	Yes	Y		1	1.2	9	1.5	7	-.5	8	.866														
32	1.2D+1.5LM1+1.0W6SER	Yes	Y		1	1.2	9	1.5	7	-.866	8	.5														
33	1.2D+1.5LM1+1.0W7SER	Yes	Y		1	1.2	9	1.5	7	-1	8															
34	1.2D+1.5LM1+1.0W8SER	Yes	Y		1	1.2	9	1.5	7	-.866	8	-.5														
35	1.2D+1.5LM1+1.0W9SER	Yes	Y		1	1.2	9	1.5	7	-.5	8	-.866														
36	1.2D+1.5LM1+1.0W10S...	Yes	Y		1	1.2	9	1.5	7		8	-1														
37	1.2D+1.5LM1+1.0W11S...	Yes	Y		1	1.2	9	1.5	7	.5	8	-.866														
38	1.2D+1.5LM1+1.0W12S...	Yes	Y		1	1.2	9	1.5	7	.866	8	-.5														
39																										
40	1.2D+1.5LM2+1.0W1SER	Yes	Y		1	1.2	10	1.5	7	1	8															
41	1.2D+1.5LM2+1.0W2SER	Yes	Y		1	1.2	10	1.5	7	.866	8	.5														
42	1.2D+1.5LM2+1.0W3SER	Yes	Y		1	1.2	10	1.5	7	.5	8	.866														
43	1.2D+1.5LM2+1.0W4SER	Yes	Y		1	1.2	10	1.5	7		8	1														
44	1.2D+1.5LM2+1.0W5SER	Yes	Y		1	1.2	10	1.5	7	-.5	8	.866														
45	1.2D+1.5LM2+1.0W6SER	Yes	Y		1	1.2	10	1.5	7	-.866	8	.5														
46	1.2D+1.5LM2+1.0W7SER	Yes	Y		1	1.2	10	1.5	7	-1	8															
47	1.2D+1.5LM2+1.0W8SER	Yes	Y		1	1.2	10	1.5	7	-.866	8	-.5														
48	1.2D+1.5LM2+1.0W9SER	Yes	Y		1	1.2	10	1.5	7	-.5	8	-.866														
49	1.2D+1.5LM2+1.0W10S...	Yes	Y		1	1.2	10	1.5	7		8	-1														
50	1.2D+1.5LM2+1.0W11S...	Yes	Y		1	1.2	10	1.5	7	.5	8	-.866														
51	1.2D+1.5LM2+1.0W12S...	Yes	Y		1	1.2	10	1.5	7	.866	8	-.5														
52																										
53	1.2D+1.5LV1	Yes	Y		1	1.2	13	1.5																		
54	1.2D+1.5LV2	Yes	Y		1	1.2	14	1.5																		
55			Y																							
56	1.2D+1.5LM3+1.0W1SER	Yes	Y		1	1.2	11	1.5	7	1	8															
57	1.2D+1.5LM3+1.0W2SER	Yes	Y		1	1.2	11	1.5	7	.866	8	.5														
58	1.2D+1.5LM3+1.0W3SER	Yes	Y		1	1.2	11	1.5	7	.5	8	.866														
59	1.2D+1.5LM3+1.0W4SER	Yes	Y		1	1.2	11	1.5	7		8	1														
60	1.2D+1.5LM3+1.0W5SER	Yes	Y		1	1.2	11	1.5	7	-.5	8	.866														
61	1.2D+1.5LM3+1.0W6SER	Yes	Y		1	1.2	11	1.5	7	-.866	8	.5														
62	1.2D+1.5LM3+1.0W7SER	Yes	Y		1	1.2	11	1.5	7	-1	8															
63	1.2D+1.5LM3+1.0W8SER	Yes	Y		1	1.2	11	1.5	7	-.866	8	-.5														
64	1.2D+1.5LM3+1.0W9SER	Yes	Y		1	1.2	11	1.5	7	-.5	8	-.866														
65	1.2D+1.5LM3+1.0W10S...	Yes	Y		1	1.2	11	1.5	7		8	-1														
66	1.2D+1.5LM3+1.0W11S...	Yes	Y		1	1.2	11	1.5	7	.5	8	-.866														
67	1.2D+1.5LM3+1.0W12S...	Yes	Y		1	1.2	11	1.5	7	.866	8	-.5														
68			Y																							
69	1.2D+1.5LM4+1.0W1SER	Yes	Y		1	1.2	12	1.5	7	1	8															
70	1.2D+1.5LM4+1.0W2SER	Yes	Y		1	1.2	12	1.5	7	.866	8	.5														
71	1.2D+1.5LM4+1.0W3SER	Yes	Y		1	1.2	12	1.5	7	.5	8	.866														
72	1.2D+1.5LM4+1.0W4SER	Yes	Y		1	1.2	12	1.5	7		8	1														
73	1.2D+1.5LM4+1.0W5SER	Yes	Y		1	1.2	12	1.5	7	-.5	8	.866														
74	1.2D+1.5LM4+1.0W6SER	Yes	Y		1	1.2	12	1.5	7	-.866	8	.5														
75	1.2D+1.5LM4+1.0W7SER	Yes	Y		1	1.2	12	1.5	7	-1	8															
76	1.2D+1.5LM4+1.0W8SER	Yes	Y		1	1.2	12	1.5	7	-.866	8	-.5														
77	1.2D+1.5LM4+1.0W9SER	Yes	Y		1	1.2	12	1.5	7	-.5	8	-.866														
78	1.2D+1.5LM4+1.0W10S...	Yes	Y		1	1.2	12	1.5	7		8	-1														
79	1.2D+1.5LM4+1.0W11S...	Yes	Y		1	1.2	12	1.5	7	.5	8	-.866														
80	1.2D+1.5LM4+1.0W12S...	Yes	Y		1	1.2	12	1.5	7	.866	8	-.5														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N40	max	2540.514	20	2523.341	25	-225.276	11	5.982	25	.961	2	3.463	25
2		min	-280.411	13	619.564	6	-4248.475	18	1.226	6	-.931	8	.668	6

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
3	N42	max	-307.986	8	2510.651	21	1055.36	11	.168	11	1.541	11	-1.204	40
4		min	-4986.875	15	520.42	40	-1054.653	5	-.167	5	-1.54	5	-6.864	21
5	N44	max	2520.415	22	2515.147	17	4268.681	24	-1.206	10	.76	8	3.447	17
6		min	-130.361	3	616.474	10	134.645	5	-5.961	17	-.791	2	.683	10
7	Totals:	max	2768.374	8	7404.528	22	3204.42	11						
8		min	-2940.534	2	2404.998	3	-3204.42	5						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M22	2x.1875	.755	33.057	10	.071	0	y	22	227.2	12150	.047	.506	2....	H1-1a
2	M8	4x.375	.720	54	4	.172	3.375	y	23	1361.827	48600	.38	4.05	1....	H1-1a
3	M24	2x.1875	.709	33.057	6	.059	0	y	18	227.2	12150	.047	.506	2....	H1-1a
4	M7	4x.375	.704	54	8	.176	3.375	y	15	1361.827	48600	.38	4.05	1....	H1-1a
5	M9	4x.375	.699	50.063	12	.172	50.625	y	54	1361.827	48600	.38	4.05	1....	H1-1a
6	M19	2x.1875	.605	2.755	12	.070	0	y	24	227.2	12150	.047	.506	3....	H1-1a
7	M26	HSS4X4X3	.581	0	23	.099	31.625	z	11	101186.4...	106812	12.662	12.662	2....	H1-1b
8	M25	HSS4X4X3	.580	0	15	.089	32.083	y	15	101186.4...	106812	12.662	12.662	2....	H1-1b
9	M27	HSS4X4X3	.578	0	15	.088	32.083	y	15	101186.4...	106812	12.662	12.662	2....	H1-1b
10	M21	2x.1875	.544	33.057	6	.057	0	y	20	227.2	12150	.047	.506	3....	H1-1a
11	M41	PIPE_2.5	.453	60	2	.026	60		2	22373.407	50715	3.596	3.596	1....	H1-1b
12	M38	PIPE_2.5	.453	60	5	.026	60		5	22373.407	50715	3.596	3.596	1....	H1-1b
13	M44	PIPE_2.5	.453	60	11	.026	60		11	22373.407	50715	3.596	3.596	1....	H1-1b
14	M23	2x.1875	.341	0	5	.058	0	y	16	227.2	12150	.047	.506	3....	H1-1a
15	M20	2x.1875	.317	28.581	2	.071	0	y	26	227.2	12150	.047	.506	3....	H1-1a
16	M6	4x.375	.262	20	16	.079	16.458	y	28	9927.715	48600	.38	4.05	1....	H1-1b
17	M2	4x.375	.255	20	20	.088	16.667	y	54	9927.715	48600	.38	4.05	1....	H1-1b
18	M4	4x.375	.253	0	23	.057	16.667	y	23	9927.715	48600	.38	4.05	1....	H1-1b
19	M5	PIPE_3.5	.227	104.6...	27	.119	104.6...		26	41651.319	78750	7.954	7.954	1....	H1-1b
20	M1	PIPE_3.5	.226	104.6...	54	.118	45.312		22	41651.319	78750	7.954	7.954	1....	H1-1b
21	M3	PIPE_3.5	.209	104.6...	54	.117	104.6...		18	41651.319	78750	7.954	7.954	1....	H1-1b
22	M12	L2x2x3	.104	34	54	.018	34	z	19	15646.652	23392.8	.558	1.239	1....	H2-1
23	M11	L2x2x3	.104	0	54	.015	0	z	15	15646.652	23392.8	.558	1.239	1....	H2-1
24	M14	L2x2x3	.102	34	38	.019	34	z	15	15646.652	23392.8	.558	1.239	1....	H2-1
25	M10	L2x2x3	.095	34	20	.018	34	z	22	15646.652	23392.8	.558	1.239	1....	H2-1
26	M40	PIPE_2.0	.086	36	2	.009	36		2	20866.733	32130	1.872	1.872	1....	H1-1b
27	M37	PIPE_2.0	.086	36	5	.009	36		5	20866.733	32130	1.872	1.872	1....	H1-1b
28	M43	PIPE_2.0	.086	36	11	.009	36		11	20866.733	32130	1.872	1.872	1....	H1-1b
29	M15	L2x2x3	.079	0	23	.014	0	z	19	15646.652	23392.8	.558	1.239	2....	H2-1
30	M13	L2x2x3	.078	0	16	.014	0	z	23	15646.652	23392.8	.558	1.239	2....	H2-1
31	M42	PIPE_2.0	.022	36	2	.003	36		2	20866.733	32130	1.872	1.872	1....	H1-1b
32	M45	PIPE_2.0	.022	36	10	.003	36		10	20866.733	32130	1.872	1.872	1....	H1-1b
33	M39	PIPE_2.0	.022	36	6	.003	36		6	20866.733	32130	1.872	1.872	1....	H1-1b

APPENDIX D

ADDITIONAL CALCUATIONS

Rectangular Weld Check (Existing 1/4" weld all around):

X-Direction Tension (lbs): $T_x := 4780.6 \cdot lbf$ (From RISA 3-D, resulting in worst case reaction combination)

Y-Direction Shear (lbs): $V_y := 2523.3 \cdot lbf$ (From RISA 3-D, resulting in worst case reaction combination)

Z-Direction Shear (lbs): $V_z := 4189.7 \cdot lbf$ (From RISA 3-D, resulting in worst case reaction combination)

X-Moment (lbs): $M_x := 5.982 \cdot kip \cdot ft$ (From RISA 3-D, resulting in worst case reaction combination)

Y-Moment (lbs): $M_y := .961 \cdot kip \cdot ft$ (From RISA 3-D, resulting in worst case reaction combination)

Z-Moment (lbs): $M_z := 3.463 \cdot kip \cdot ft$ (From RISA 3-D, resulting in worst case reaction combination)

Length of Weld, d (in): $d := 4in$ (Length of Weld)

Width of Weld, b (in): $b := 4in$ (Width of Weld)

Section Modulus Bending: $Sx\_z := b \cdot d + \frac{d^2}{3} = 21.333 \cdot in^2$ $Sx\_y := b \cdot d + \frac{b^2}{3} = 21.333 \cdot in^2$

Polar Moment of Inertia: $Jw := \frac{(b + d)^3}{6} = 85.333 \cdot in^3$

Shear Component on Weld:

Shear from Concentrated Load: $f_{vx} := \frac{V_y}{2d} = 315.4 \cdot \frac{lbf}{in}$ $f_{vz} := \frac{V_z}{2b} = 523.7 \cdot \frac{lbf}{in}$

Shear from Moment Load: $f_{vh\_my} := \frac{M_x \cdot \left(\frac{d}{2}\right)}{Jw} = 1.682 \times 10^3 \cdot \frac{lb}{ir}$ $f_{vv\_my} := \frac{M_x \cdot \left(\frac{b}{2}\right)}{Jw} = 1.682 \times 10^3 \cdot \frac{lbf}{in}$

Horizontal Shear: $f_{vh} := f_{vh\_my} + f_{vz} = 2.206 \times 10^3 \cdot \frac{lbf}{in}$

Vertical Shear: $f_{vv} := f_{vv\_my} + f_{vx} = 1.998 \times 10^3 \cdot \frac{lbf}{in}$

Resultant Shear: $F_v := \sqrt{f_{vh}^2 + f_{vv}^2} = 2.976 \times 10^3 \cdot \frac{lbf}{in}$

Tensile Component on Weld:

Tension from Concentrated Load: $f_{ty} := \frac{T_x}{2d + 2 \cdot b} = 298.8 \cdot \frac{lbf}{in}$

Tension from Moment Load: $f_{t\_mx} := \frac{M_y}{Sx\_y} = 540.563 \cdot \frac{lbf}{in}$ $f_{t\_mz} := \frac{M_z}{Sx\_y} = 1947.938 \cdot \frac{lbf}{in}$

Resultant Tension:

$$F_t := f_{ty} + f_{t\_mx} + f_{t\_mz} = 2.787 \cdot \frac{kip}{in}$$

Total Force on Weld:
(force per linear inch):

$$f_r := \sqrt{F_v^2 + F_t^2} = 4077.7 \cdot \frac{lbf}{in}$$

Weld sized (1/16 inch):

$D := 4$ (Used)

Weld Capacity using 1/4"
weld (kip/in):

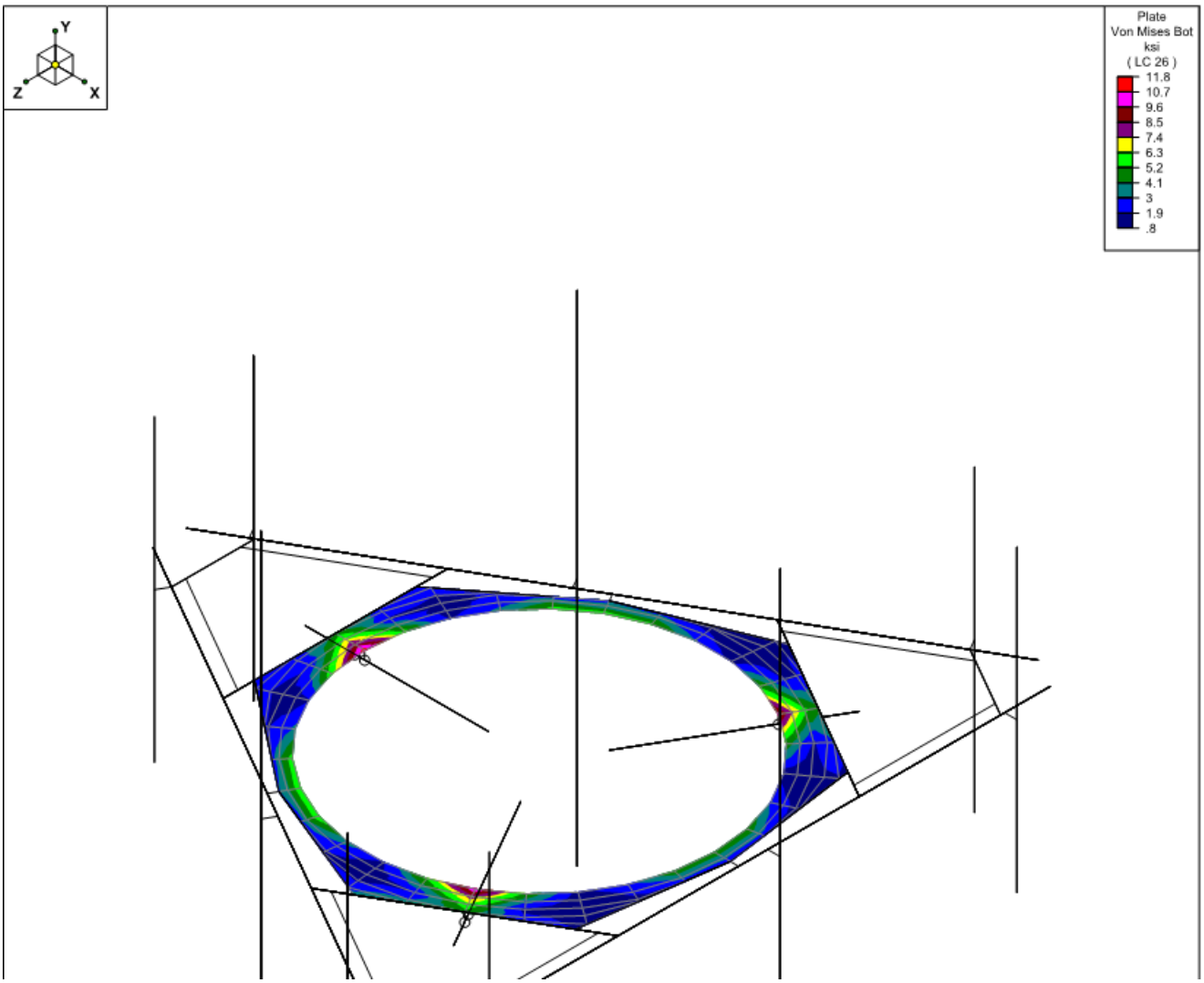
$$Weld_{Cap} := 1.392 \cdot D \cdot \frac{kip}{in} = 5.568 \cdot \frac{kip}{in}$$

$$Check := \begin{cases} \text{"OK, connection can be used"} & \text{if } f_r \le Weld_{Cap} \\ \text{"No Good"} & \text{otherwise} \end{cases}$$

Check = "OK, connection can be used"

$$Interaction := \frac{f_r}{Weld_{Cap}} = 73.2 \cdot \%$$

Plate Check (3/16" Thick):



P21	max	T	1.66	7	.469	7	2.772	25	1.201	3	5.507	26
	min		-.512	13	-5.475	26	.25	5	-.174	6	.655	5
	max	B	.624	6	-.186	7	3.973	26	2.016	6	**8.463**	26
	min		-.953	26	-8.899	26	.39	7	1.3	54	.706	7

Maximum Applied Stress: $\sigma_{app} := 8.463 \cdot ksi$ (Obtained from Risa 3D)

Design Stress: $\sigma_d := 36 \cdot ksi \cdot 0.9 = 32.4 \cdot ksi$ (36 KSI Steel assumed)

Stress Check: $Check := \begin{cases} \text{"OK"} & \text{if } \sigma_{app} \le \sigma_d \\ \text{"NO GOOD"} & \text{otherwise} \end{cases}$ $\frac{\sigma_{app}}{\sigma_d} = 26.12 \cdot \%$

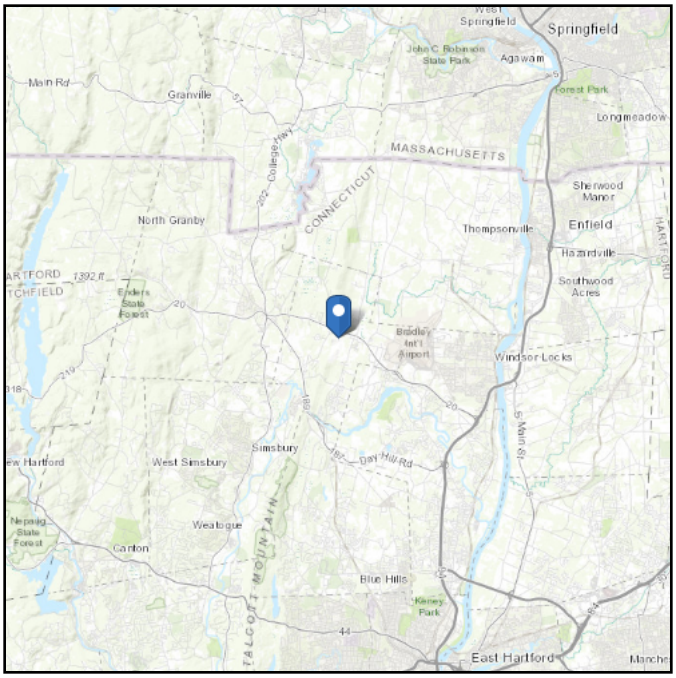
Check = "OK"

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 255.76 ft (NAVD 88)
Latitude: 41.941553
Longitude: -72.738681



Wind

Results:

Wind Speed:	119 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri Apr 05 2019

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

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

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

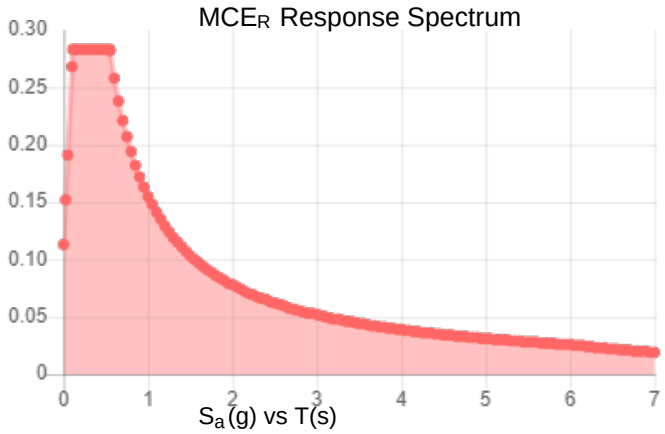
Seismic

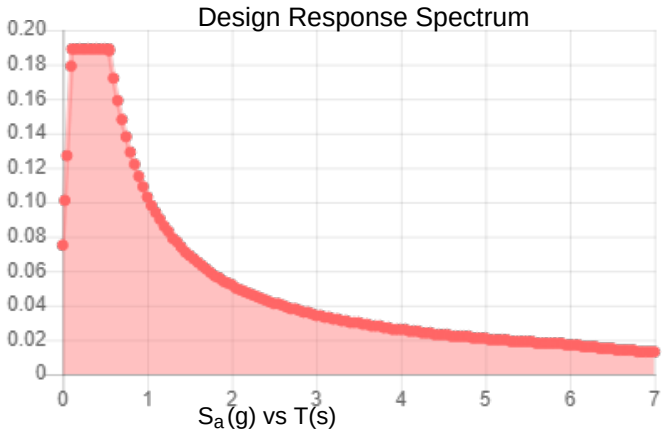
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.065	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.087
S_{MS} :	0.283	PGA_M :	0.14
S_{M1} :	0.155	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Fri Apr 05 2019

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:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Apr 05 2019

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.

Exhibit F

Power Density/RF Emissions Report

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: CT11542A

E. Granby - Sprint
60 South Main Street
East Granby, CT 06026

March 21, 2019

EBI Project Number: 6219000884

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	36.89 %

EBI Consulting
environmental | engineering | due diligence

March 21, 2019

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

Emissions Analysis for Site: **CT11542A – E. Granby - Sprint**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **60 South Main Street, East Granby, 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) frequency band 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 **60 South Main Street, East Granby, 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 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 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 (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 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.

5) 1 microwave backhaul channel (10GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.

6) Cable losses were factored in the calculations for this site. Since the proposed 1900 MHz radios are ground mounted the following cable loss values were used. For each ground mounted 1900 MHz (PCS) radio there was 0.99 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 105 feet of 7/8" coax.

7) 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.

8) 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.

9) The antennas used in this modeling are the **RFS APXV18-209014-C** for 1900 MHz (PCS) and 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.

10) The antenna mounting height centerline of the proposed antennas is **90 feet** above ground level (AGL).

11) 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.

12) 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:	RFS APXV18-209014-C	Make / Model:	RFS APXV18-209014-C	Make / Model:	RFS APXV18-209014-C
Gain:	14.4 dBd	Gain:	14.4 dBd	Gain:	14.4 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 feet
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	2,083.16	ERP (W):	2,083.16	ERP (W):	2,083.16
Antenna A1 MPE%	**1.06**	Antenna B1 MPE%	**1.06**	Antenna C1 MPE%	**1.06**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 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%	**2.96**	Antenna B3 MPE%	**2.96**	Antenna C3 MPE%	**2.96**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.02 %**
AT&T	**10.66** %
MetroPCS	**1.36** %
Verizon Wireless	**17.97** %
Sprint	**2.88** %
Site Total MPE %:	**36.89 %**

T-Mobile Sector A Total:	4.02 %
T-Mobile Sector B Total:	4.02 %
T-Mobile Sector C Total:	4.02 %
Site Total:	36.89 %

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	877.12	90	8.94	PCS - 1900 MHz	1000.00	0.89%
T-Mobile PCS - 1900 MHz GSM	1	328.92	90	1.68	PCS - 1900 MHz	1000.00	0.17%
T-Mobile 600 MHz LTE	2	788.97	90	8.04	600 MHz	400.00	2.01%
T-Mobile 700 MHz LTE	2	432.54	90	4.41	700 MHz	467.00	0.95%
						Total:	**4.02 %**

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:	4.02 %
Sector B:	4.02 %
Sector C:	4.02 %
T-Mobile Maximum MPE % (Per Sector):	4.02 %
Site Total:	36.89 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **36.89%** 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.