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

April 24, 2019

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

RE: **Notice of Exempt Modification for Crown Site BU: 842862**
AT&T Site ID: 10071016
259 Commerce Street, East Haven, CT 06512
Latitude: 41° 15′ 22.88″/ Longitude: -72° 52′ 32.80″

Dear Ms. Bachman:

AT&T currently maintains (9) antennas at the 55-foot level of the existing 58-foot monopole at 259 Commerce Street in East Haven, Connecticut. The tower is owned by Crown Castle. The property is owned by Stephen J. Viglione. AT&T now intends to replace (3) antennas, remove (6) TMAs, replace (6) RRUs, add (1) DC6 and (2) DC power cables.

The facility was approved by the Siting Council in Petition Number 634 on July 8, 2003. No conditions were attached that would be impacted by this modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Joseph Maturo Jr., Mayor of the Town of East Haven, and the East Haven Planning & Zoning Department, as well as the property owner and Crown Castle is the tower 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, AT&T 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: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Exhibit-B: Structural Modification Report
Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable Joseph Maturo Jr., Mayor
Town of East Haven
Town Hall – Upper Level
250 Main Street
East Haven, CT 06512-3004

Christopher Soto, Planning & Zoning Enforcement Officer
Town Hall – Lower Level
250 Main Street
East Haven, CT 06512-3004

Stephen J. Viglione
259 Commerce Street
East Haven, CT 06512-4147

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 24APR19
ACTWGT: 4.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **MELANIE BACHMAN**
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051
(860) 827-2951 REF: 1765.6680
INV:
PO: DEPT:

565J1/D7E5/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7750 4662 9829**

THU - 25 APR 10:30A
PRIORITY OVERNIGHT

EB BDLA

06051
CT-US **BDL**

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.

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 24APR19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **JOSEPH MATURO, JR., MAYOR**
TOWN OF EAST HAVEN
TOWN HALL - UPPER LEVEL
250 MAIN STREET
EAST HAVEN CT 06512
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J1/D7E5/23AD

FedEx Express

J191019010701uv

THU - 25 APR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7750 4665 4370**

06512
BDL
CT-US

EB EFBA

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.

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 24APR19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **CHRISTOPHER SOTO, ZEO**
TOWN OF EAST HAVEN
TOWN HALL - LOWER LEVEL
250 MAIN STREET
EAST HAVEN CT 06512
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J1/D7E5/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7750 4667 7810**

THU - 25 APR 10:30A
PRIORITY OVERNIGHT

EB EFBA

06512
CT-US **BDL**

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.

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 24APR19
ACTWGT: 2.00 LB
CAD: 104924194/INET4100

BILL SENDER

TO **STEPHEN J. VIGLIONE**
259 COMMERCE STREET

EAST HAVEN CT 06512
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J1/D7E5/23AD

J191019010701uv

THU - 25 APR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7750 4669 6540**

EB EFBA

06512
BDL
CT-US

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.

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2016.

TOWN of EAST HAVEN
ASSESSOR

Information on the Property Records for the Municipality of East Haven was last updated on 4/12/2019.

Property Summary Information

Parcel Data And Values | Building | Outbuildings | Sales | Permits

Parcel Information

Location:	259 COMMERCE ST	Property Use:	Industrial	Primary Use:	Light Industrial
Unique ID:	V0098600	Map Block Lot:	090 1013 005	Acres:	0.49
490 Acres:	0.00	Zone:	LI-2	Volume / Page:	0322/0838
Developers Map / Lot:	PT.4&7	Census:	1801000		

Value Information

	Appraised Value	Assessed Value
Land	114,000	79,800
Buildings	587,740	411,420

	Appraised Value	Assessed Value
Detached Outbuildings	54,682	38,280
Total	756,422	529,500

Owner's Information

Owner's Data
VIGLIONE STEPHEN J 259 COMMERCE ST EAST HAVEN CT 06512

Back To Search (JavaScript:window.history.back(1);)

Print View (PrintPage.aspx?towncode=044&uniqueid=V0098600)

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2016.

TOWN of EAST HAVEN
ASSESSOR

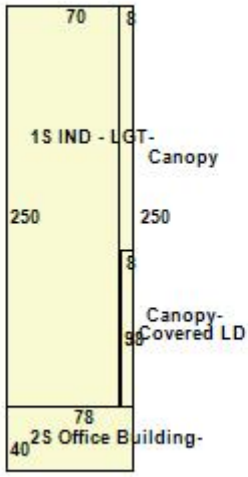
Information on the Property Records for the Municipality of East Haven was last updated on 4/12/2019.

Property Summary Information

Parcel Data And Values | Building | Outbuildings | Sales | Permits

Building 1

(Images/Towns/EastHavenWeb/Pictures/V0098600-01.JPG)



(Images/Towns/EastHavenWeb/Sketches/V0098600_01.jpg)

Category:	Industrial	Use:	Light Manu	GLA:	23,740
Stories:	1.00	Construction:	Masonry and Wood Frame	Year Built:	1956
Heating:	FHA	Fuel:	Gas	Cooling Percent:	20
Siding:	Concrete Block/B. V. Solid	Roof Material:		Beds/Units:	0

Special Features

Wet Sprinklers	3160

Attached Components

Type:	Year Built:	Area:
Canopy	1984	2,078
Covered Loading Dock	1984	783

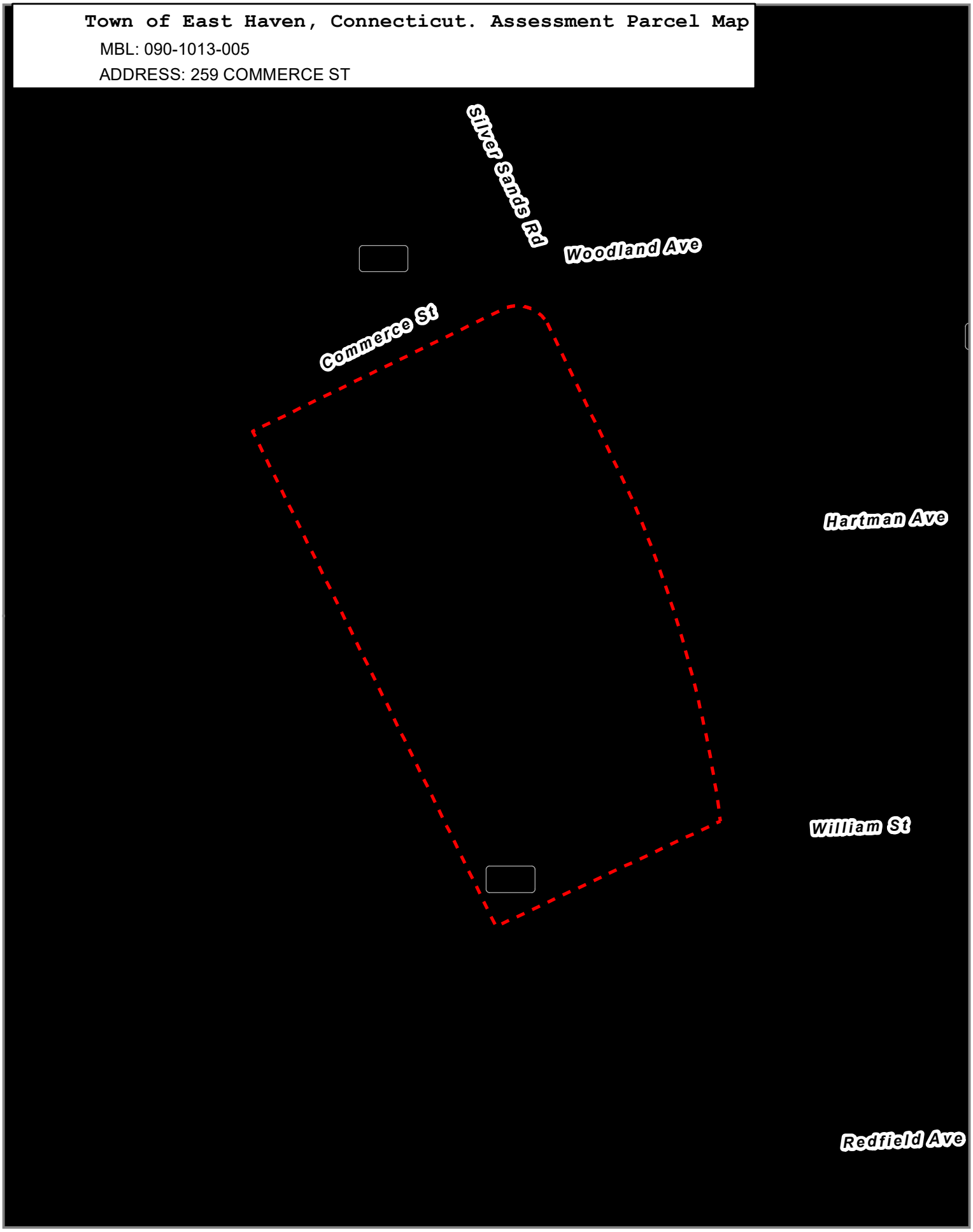
Back To Search (JavaScript:window.history.back(1);)

Print View (PrintPage.aspx?towncode=044&uniqueid=V0098600)

Town of East Haven, Connecticut. Assessment Parcel Map

MBL: 090-1013-005

ADDRESS: 259 COMMERCE ST



1 inch = 100 feet

0 50 100 150 200 Feet

Disclaimer:
This map is for informational purposes only All information is subject to verification by any user. The Town of East Haven and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced: 10/2018

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING TOWER:

- INSTALL AT&T ANTENNA (800-10965) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 4449 B5/12 (700/850) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL AT&T 8843 B2/B66A (AWS/PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).
- INSTALL SURGE ARRESTOR (DC6-48-60-18-8F) (TOTAL OF 1).
- INSTALL (2) DC TRUNKS.
- INSTALL (3) SITEPRO 1 STIFF ARM KITS (PART # STK-U)(TYP OF 1 PER SECTOR, TOTAL OF 3).

ITEMS TO BE MOUNTED INSIDE EXISTING SHELTER:

- ADD XMU
- ADD 6630 FOR 5G 850.

ITEMS TO REMAIN:

- (6) ANTENNAS, (3) RRU'S, (6) TMAS, & (2) SURGE SUPPRESSORS.

SITE ADDRESS:	259 COMMERCE STREET EASTHAVEN, CT 06512
LATITUDE (NAD 83):	N 41° 15' 22.18"
LONGITUDE (NAD 83):	W 72° 52' 32.80"
LANDLORD:	CROWN CASTLE INTERNATIONAL 500 W. CUMMINGS PARK, STE 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE/OUTDOOR
TOWER HEIGHT:	59'
RAD CENTER:	55'
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

SITE NUMBER: CTL05048

FA LOCATION CODE: 10071016

SITE NAME: EAST HAVEN SOUTH

CROWN SITE NAME: EAST HAVEN SOUTH

PROJECT: 4TX4RX SOFTWARE RETROFIT, 4TX4RX SOFTWARE RETROFIT, LTE 4C, LTE 5C

PACE ID: MRCTB034964, MRCTB034970, MRCTB034847, MRCTB034865

BU#: 842862

NOTE:

ALL CONSTRUCTION ACTIVITIES ARE TO BE COMPLETED DIRECTLY THROUGH CROWN. CONTRACTOR MUST HAVE CONSTRUCTION PO AND NTP FROM CROWN DIRECT IN ORDER TO BEGIN. PRE-APPROVAL TO ENTER THE PROPERTY MUST BE OBTAINED. FOR ACCESS AUTHORIZATION, PLEASE CONTACT CROWN.

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO:	EP4TURNL
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

TITLE SHEET

T-1

DRAWING INDEX

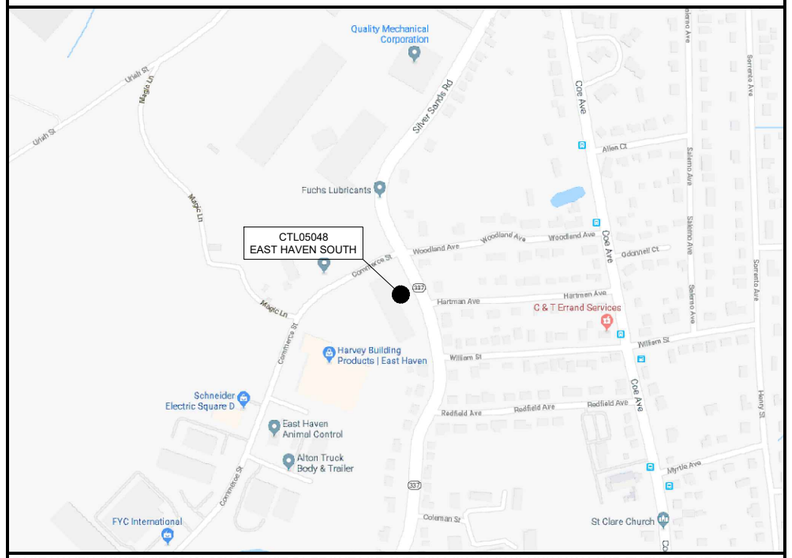
SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES I
GN-2	GENERAL NOTES II
C-1	SITE PLAN
C-2	EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION
C-3	EXISTING & PROPOSED ANTENNA LAYOUT
C-4	EQUIPMENT DETAILS
S-1	MOUNT MODIFICATION DETAILS
RF-1	ANTENNA CHART & RF EQUIPMENT SCHEMATIC
G-1	GROUNDING DETAILS

CROWN CASTLE SITE ID #: 842862
CROWN CASTLE SITE NAME: EAST HAVEN SOUTH

ENGINEERING

2018 CONNECTICUT STATE BUILDING CODE
2018 AMENDMENT WITH 2015 INTERNATIONAL BUILDING CODE
2009 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
2015 INTERNATIONAL MECHANICAL CODE
2015 INTERNATIONAL ENERGY CONSERVATION CODE
2017 NATIONAL ELECTRICAL CODE (NFPA 70 2017)
ANSI/TIA-222-G

VICINITY MAP



EAST HAVEN SOUTH CT-5048I-95N TO EXIT 51 FRONTAGE AVE FOLLOW ALONG HIGHWAY AND THEN AT THE LIGHT BEAR RIGHT ONTO ROUTE 1 NORTH. GO TO 2ND TRAFFIC LIGHT AND TURN RIGHT ONTO HEMINGWAY AVE (RTE. 142). CONTINUE ALONG THIS ROAD TO RTE 337 AND STAY TO YOUR RIGHT. STAY ON THIS ROAD UNTIL YOU SEE THE SIGN FOR EAST HAVEN INDUSTRIAL PARK. AT THIS LIGHT MAKE A RIGHT. FOLLOW ALONG WINDING ROAD A SHORT DISTANCE UNTIL YOU SEE THE MONOPOLE AND A WHITE PVC FENCE. TURN RIGHT ONTO COMMERCE ST. AND PARK ALONG SIDE ROAD. WALK TO SITE COMPOUND. DEMARC LOCATED OUTSIDE COMPOUND NEXT TO POWER METER. ADDRESS: 259 COMMERCE ST, EAST HAVENMETER: 014 005 764 CID'S: GSM ET42-HCGS708713 ET126-HCGS743461

GENERAL NOTES

1. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

811

UNDERGROUND SERVICE ALERT

STATE LAW REQUIRES
TWO WORKING DAYS NOTICE PRIOR TO ANY
EARTH MOVING ACTIVITIES BY CALLING
DIAL 811

PART 1 - GENERAL

1.1 GENERAL CONDITIONS:

A. CONTRACTOR SHALL INSPECT THE EXISTING SITE CONDITIONS PRIOR TO SUBMITTING BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTORS FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.

B. THE CONTRACTOR SHALL OBTAIN PERMITS, LICENSES, MAKE ALL DEPOSITS, AND PAY ALL FEES REQUIRED FOR THE CONSTRUCTION PERFORMANCE FOR THE WORK UNDER THIS SECTION.

C. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL SYSTEMS AND COMPONENTS COVERED UNDER THIS SECTION. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS. DRAWING SHALL NOT BE SCALED TO DETERMINE DIMENSIONS.

1.2 LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES.

A. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, AND ALL APPLICABLE LOCAL LAWS, REGULATIONS, ORDINANCES, STATUTES AND CODES. CONDUIT BENDS SHALL BE THE RADIUS BEND FOR THE TRADE SIZE OF CONDUIT IN COMPLIANCE WITH THE LATEST EDITIONS OF NEC.

1.3 REFERENCES:

A. THE PUBLICATIONS LISTED BELOW ARE PART OF THIS SPECIFICATION. EACH PUBLICATION SHALL BE THE LATEST REVISION AND ADDENDUM IN EFFECT ON THE DATE. THIS SPECIFICATION IS ISSUED FOR CONSTRUCTION UNLESS OTHERWISE NOTED. EXCEPT AS MODIFIED BY THE REQUIREMENT SPECIFIED HEREIN OR THE DETAILS OF THE DRAWINGS, WORK INCLUDED IN THIS SPECIFICATION SHALL CONFORM TO THE APPLICABLE PROVISION OF THESE PUBLICATIONS.

1. ANSI/IEEE (AMERICAN NATIONAL STANDARDS INSTITUTE)
2. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
3. ICEA (INSULATED CABLE ENGINEERS ASSOCIATION)
4. NEMA (NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION)
5. NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)
6. OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION)
7. UL (UNDERWRITERS LABORATORIES INC.)
8. AT&T GROUNDING AND BONDING STANDARDS TP-76416

1.4 SCOPE OF WORK

A. WORK UNDER THIS SECTION SHALL CONSIST OF FURNISHING ALL LABOR, MATERIAL, AND ASSOCIATED SERVICES REQUIRED TO COMPLETE REQUIRED CONSTRUCTION AND BE OPERATIONAL.

B. ALL ELECTRICAL EQUIPMENT UNDER THIS CONTRACT SHALL BE PROPERLY TESTED, ADJUSTED, AND ALIGNED BY THE CONTRACTOR.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATING, DRAINING, TRENCHES, BACKFILLING, AND REMOVAL OF EXCESS DIRT.

D. THE CONTRACTOR SHALL FURNISH TO THE OWNER WITH CERTIFICATES OF A FINAL INSPECTION AND APPROVAL FROM THE INSPECTION AUTHORITIES HAVING JURISDICTION.

E. THE CONTRACTOR SHALL PREPARE A COMPLETE SET OF AS-BUILT DRAWINGS, DOCUMENT ALL WIRING EQUIPMENT CONDITIONS, AND CHANGES WHILE COMPLETING THIS CONTRACT. THE AS-BUILT DRAWINGS SHALL BE SUBMITTED AT COMPLETION OF THE PROJECT.

PART 2 - PRODUCTS

2.1 GENERAL:

A. ALL MATERIALS AND EQUIPMENT SHALL BE UL LISTED, NEW, AND FREE FROM DEFECTS.

B. ALL ITEMS OF MATERIALS AND EQUIPMENT SHALL BE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION AS SUITABLE FOR THE USE INTENDED.

C. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

D. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 10,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.

2.2 MATERIALS AND EQUIPMENT:

A. CONDUIT:

1. RIGID METAL CONDUIT (RMC) SHALL BE HOT-DIPPED GALVANIZED INSIDE AND OUTSIDE INCLUDING ENDS AND THREADS AND ENAMELED OR LACQUERED INSIDE IN ADDITION TO GALVANIZING.
2. LIQUIDTIGHT FLEXIBLE METAL CONDUIT SHALL BE UL LISTED.
3. CONDUIT CLAMPS, STRAPS AND SUPPORTS SHALL BE STEEL OR MALLEABLE IRON. ALL FITTINGS SHALL BE COMPRESSION AND CONCRETE TIGHT TYPE. GROUNDING BUSHINGS WITH INSULATED THROATS SHALL BE INSTALLED ON ALL CONDUIT TERMINATIONS.
4. NONMETALLIC CONDUIT AND FITTINGS SHALL BE SCHEDULE 40 PVC. INSTALL USING SOLVENT-CEMENT-TYPE JOINTS AS RECOMMENDED BY THE MANUFACTURER.

B. CONDUCTORS AND CABLE:

1. CONDUCTORS AND CABLE SHALL BE FLAME-RETARDANT, MOISTURE AND HEAT RESISTANT THERMOPLASTIC, SINGLE CONDUCTOR, COPPER, TYPE THHN/THWN-2, 600 VOLT, SIZE AS INDICATED, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR USED.
2. #10 AWG AND SMALLER CONDUCTOR SHALL BE SOLID OR STRANDED AND #8 AWG AND LARGER CONDUCTORS SHALL BE STRANDED.
3. SOLDERLESS, COMPRESSION-TYPE CONNECTORS SHALL BE USED FOR TERMINATION OF ALL STRANDED CONDUCTORS.
4. STRAIN-RELIEF SUPPORTS GRIPS SHALL BE HUBBELL KELLEMS OR APPROVED EQUAL. CABLES SHALL BE SUPPORTED IN ACCORDANCE WITH THE NEC AND CABLE MANUFACTURER'S RECOMMENDATIONS.
5. ALL CONDUCTORS SHALL BE TAGGED AT BOTH ENDS OF THE CONDUCTOR, AT ALL PULL BOXES, J-BOXES, EQUIPMENT AND CABINETS AND SHALL BE IDENTIFIED WITH APPROVED PLASTIC TAGS (ACTION CRAFT, BRADY, OR APPROVED EQUAL).

C. DISCONNECT SWITCHES:

1. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, DEAD-FRONT, QUICK-MAKE, QUICK-BREAK, EXTERNALLY OPERABLE, HANDLE LOCKABLE AND INTERLOCK WITH COVER IN CLOSED POSITION, RATING AS INDICATED, UL LABELED FURNISHED IN NEMA 3R ENCLOSURE, SQUARE-D OR ENGINEER APPROVED EQUAL.

D. CHEMICAL ELECTROLYTIC GROUNDING SYSTEM:

1. INSTALL CHEMICAL GROUNDING AS REQUIRED. THE SYSTEM SHALL BE ELECTROLYTIC MAINTENANCE FREE ELECTRODE CONSISTING OF RODS WITH A MINIMUM #2 AWG CU EXOTHERMICALLY WELDED PIGTAIL, PROTECTIVE BOXES, AND BACKFILL MATERIAL. MANUFACTURER SHALL BE LYNCOLE XIT GROUNDING ROD TYPES K2-(*)CS OR K2L-(*)CS (*) LENGTH AS REQUIRED.
2. GROUND ACCESS BOX SHALL BE A POLYPLASTIC BOX FOR NON-TRAFFIC APPLICATIONS, INCLUDING BOLT DOWN FLUSH COVER WITH "BREATHER" HOLES, XIT MODEL #XB-22. ALL DISCONNECT SWITCHES AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS ID NUMBERING, AND THE ELECTRICAL POWER SOURCE.
3. BACKFILL MATERIAL SHALL BE LYNCONITE AND LYNCOLE GROUNDING GRAVEL.

E. SYSTEM GROUNDING:

1. ALL GROUNDING COMPONENTS SHALL BE TINNED AND GROUNDING CONDUCTOR SHALL BE #2 AWG BARE, SOLID, TINNED, COPPER. ABOVE GRADE GROUNDING CONDUCTORS SHALL BE INSULATED WHERE NOTED.
2. GROUNDING BUSES SHALL BE BARE, TINNED, ANNEALED COPPER BARS OF RECTANGULAR CROSS SECTION. STANDARD BUS BARS MGB, SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. THEY SHALL NOT BE FABRICATED OR MODIFIED IN THE FIELD. ALL GROUNDING BUSES SHALL BE IDENTIFIED WITH MINIMUM 3/4" LETTERS BY WAY OF STENCILING OR DESIGNATION PLATE.
3. CONNECTORS SHALL BE HIGH-CONDUCTIVITY, HEAVY DUTY, LISTED AND LABELED AS GROUNDING CONNECTORS FOR THE MATERIALS USED. USE TWO-HOLE COMPRESSION LUGS WITH HEAT SHRINK FOR MECHANICAL CONNECTIONS. INTERIOR CONNECTIONS USE TWO-HOLE COMPRESSION LUGS WITH INSPECTION WINDOW AND CLEAR HEAT SHRINK.
4. EXOTHERMIC WELDED CONNECTIONS SHALL BE PROVIDED IN KIT FORM AND SELECTED FOR THE SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND OTHER ITEMS TO BE CONNECTED.
5. GROUND RODS SHALL BE COPPER-CLAD STEEL WITH HIGH-STRENGTH STEEL CORE AND ELECTROLYTIC-GRADE COPPER OUTER SHEATH, MOLTEN WELDED TO CORE, 5/8"x10'-0". ALL GROUNDING RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES.
6. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS IN COMPLIANCE WITH THE AT&T SPECIFICATIONS AND NEC. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULLBOXES, DISCONNECT SWITCHES, STARTERS, AND EQUIPMENT CABINETS.

F. OTHER MATERIALS:

6. THE CONTRACTOR SHALL PROVIDE OTHER MATERIALS, THOUGH NOT SPECIFICALLY DESCRIBED, WHICH ARE REQUIRED FOR A COMPLETELY OPERATIONAL SYSTEM AND PROPER INSTALLATION OF THE WORK.
7. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE SHOWN OR REQUIRED BY NEC.

G. PANELS AND LOAD CENTERS:

1. ALL PANEL DIRECTORIES SHALL BE TYPEWRITTEN.

PART 3 - EXECUTION

3.1 GENERAL:

A. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. EQUIPMENT SHALL BE TIGHTLY COVERED AND PROTECTED AGAINST DIRT OR WATER, AND AGAINST CHEMICAL OR MECHANICAL INJURY DURING INSTALLATION AND CONSTRUCTION PERIODS.

3.2 LABOR AND WORKMANSHIP:

A. ALL LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED FOR THE ELECTRICAL SYSTEM SHALL BE INSTALLED BY EXPERIENCED WIREMEN, IN A NEAT AND WORKMAN-LIKE MANNER.

B. ALL ELECTRICAL EQUIPMENT SHALL BE ADJUSTED, ALIGNED AND TESTED BY THE CONTRACTOR AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE.

C. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL EXPOSED EQUIPMENT, REMOVE ALL LABELS AND ANY DEBRIS, CRATING OR CARTONS AND LEAVE THE INSTALLATION FINISHED AND READY FOR OPERATION.

3.3 COORDINATION:

A. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE OWNER-FURNISHED EQUIPMENT DELIVERY SCHEDULE TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

3.4 INSTALLATION:

A. CONDUIT:

1. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED. NO CONDUIT OR TUBING OF LESS THAN 3/4 INCH TRADE SIZE.
2. PROVIDE RIGID PVC SCHEDULE 80 CONDUITS FOR ALL RISERS, RMC OTHERWISE NOTED. EMT MAY BE INSTALLED FOR EXTERIOR CONDUITS WHERE NOT SUBJECT TO PHYSICAL DAMAGE.
3. INSTALL SCHEDULE 40 PVC CONDUIT WITH A MINIMUM COVER OF 24" UNDER ROADWAYS, PARKING LOTS, STREETS, AND ALLEYS. CONDUIT SHALL HAVE A MINIMUM COVER OF 18" IN ALL OTHER NON-TRAFFIC APPLICATIONS (REFER TO 2017 NEC, TABLE 300.5).
4. USE GALVANIZED FLEXIBLE STEEL CONDUIT WHERE DIRECT CONNECTION TO EQUIPMENT WITH MOVEMENT, VIBRATION, OR FOR EASE OF MAINTENANCE. USE LIQUID TIGHT, FLEXIBLE METAL CONDUIT FOR OUTDOOR APPLICATIONS. INSTALL GALVANIZED FLEXIBLE STEEL CONDUIT AT ALL POINTS OF CONNECTION TO EQUIPMENT MOUNTED ON SUPPORT TO ALLOW FOR EXPANSION AND CONTRACTION.
5. A RUN OF CONDUIT BETWEEN BOXES OR EQUIPMENT SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF THREE QUARTER-BENDS. CONDUIT BEND SHALL BE MADE WITH THE UL LISTED BENDER OR FACTORY 90 DEGREE ELBOWS MAY BE USED.
6. FIELD FABRICATED CONDUITS SHALL BE CUT SQUARE WITH A CONDUIT CUTTING TOOL AND REAMED TO PROVIDE A SMOOTH INSIDE SURFACE.
7. PROVIDE INSULATED GROUNDING BUSHING FOR ALL CONDUITS.
8. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL CONDUITS DURING CONSTRUCTION. TEMPORARY OPENINGS IN THE CONDUIT SYSTEM SHALL BE PLUGGED OR CAPPED TO PREVENT ENTRANCE OF MOISTURE OR FOREIGN MATTER. CONTRACTOR SHALL REPLACE ANY CONDUITS CONTAINING FOREIGN MATERIALS THAT CANNOT BE REMOVED.
9. ALL CONDUITS SHALL BE SWABBED CLEAN BY PULLING AN APPROPRIATE SIZE MANDREL THROUGH THE CONDUIT BEFORE INSTALLATION OF CONDUCTORS OR CABLES. CONDUIT SHALL BE FREE OF DIRT AND DEBRIS.
10. INSTALL PULL STRINGS IN ALL CLEAN EMPTY CONDUITS. IDENTIFY PULL STRINGS AT EACH END.
11. INSTALL 2" HIGHLY VISIBLE AND DETECTABLE TAPE 12" ABOVE ALL UNDERGROUND CONDUITS AND CONDUCTORS.
12. CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST COLLECTION OF TRAPPED CONDENSATION.
13. PROVIDE CORE DRILLING AS NECESSARY FOR PENETRATIONS TO ALLOW FOR RACEWAYS AND CABLES TO BE ROUTED THROUGH THE BUILDING. DO NOT PENETRATE STRUCTURAL MEMBERS. SLEEVES AND/OR PENETRATIONS IN FIRE RATED CONSTRUCTION SHALL BE EFFECTIVELY SEALED WITH FIRE RATED MATERIAL WHICH SHALL MAINTAIN THE FIRE RATING OF THE WALL OR STRUCTURE. FIRE STOPS AT FLOOR PENETRATIONS SHALL PREVENT PASSAGE OF WATER, SMOKE, FIRE, AND FUMES. ALL MATERIAL SHALL BE UL APPROVED FOR THIS PURPOSE.

B. CONDUCTORS AND CABLE:

1. ALL POWER WIRING SHALL BE COLOR CODED AS FOLLOWS:

DESCRIPTION	208/240/120 VOLT SYSTEMS
PHASE A	BLACK
PHASE B	RED
PHASE C	BLUE
NEUTRAL	WHITE
GROUNDING	GREEN

2. SPLICES SHALL BE MADE ONLY AT OUTLETS, JUNCTION BOXES, OR ACCESSIBLE RACEWAY CONDUITS APPROVED FOR THIS PURPOSE.
3. PULLING LUBRICANTS SHALL BE UL APPROVED. CONTRACTOR SHALL USE NYLON OR HEMP ROPE FOR PULLING CONDUCTOR OR CABLES INTO THE CONDUIT.
4. CABLES SHALL BE NEATLY TRAINED, WITHOUT INTERLACING, AND BE OF SUFFICIENT LENGTH IN ALL BOXES & EQUIPMENT TO PERMIT MAKING A NEAT ARRANGEMENT. CABLES SHALL BE SECURED IN A MANNER TO AVOID TENSION ON CONDUCTORS OR TERMINALS. CONDUCTORS SHALL BE PROTECTED FROM MECHANICAL INJURY AND MOISTURE. SHARP BENDS OVER CONDUIT BUSHINGS IS PROHIBITED. DAMAGED CABLES SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

C. DISCONNECT SWITCHES:

1. INSTALL DISCONNECT SWITCHES LEVEL AND PLUMB. CONNECT TO WIRING SYSTEM AND GROUNDING SYSTEM AS INDICATED.

D. GROUNDING:

1. ALL METALLIC PARTS OF ELECTRICAL EQUIPMENT WHICH DO NOT CARRY CURRENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE BUILDING MANUFACTURER, AT&T GROUNDING AND BONDING STANDARDS TP-76416, ND-00135, AND THE NATIONAL ELECTRICAL CODE.
2. PROVIDE ELECTRICAL GROUNDING AND BONDING SYSTEM INDICATED WITH ASSEMBLY OF MATERIALS, INCLUDING GROUNDING ELECTRODES, BONDING JUMPERS AND ADDITIONAL ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.
3. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUNDING CONDUCTORS SHALL NOT BE LOOPED OR SHARPLY BENT. ROUTE GROUNDING CONNECTIONS AND CONDUCTORS TO GROUND IN THE SHORTEST AND STRAIGHTEST PATHS POSSIBLE TO MINIMIZE TRANSIENT VOLTAGE RISES.
4. BUILDINGS AND/OR NEW TOWERS GREATER THAN 75 FEET IN HEIGHT AND WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 AWG COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). SEE STANDARD 6.3.2.2.
5. TIGHTEN GROUNDING AND BONDING CONNECTORS, INCLUDING SCREWS AND BOLTS, IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED TORQUE TIGHTENING VALUES FOR CONNECTORS AND BOLTS. WHERE MANUFACTURER'S TORQUING REQUIREMENTS ARE NOT AVAILABLE, TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUE VALUES SPECIFIED IN UL TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
6. CONTRACTOR SHALL VERIFY THE LOCATIONS OF GROUNDING TIE-IN-POINTS TO THE EXISTING GROUNDING SYSTEM. ALL UNDERGROUND GROUNDING CONNECTIONS SHALL BE MADE BY THE EXOTHERMIC WELD PROCESS AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. ALL GROUNDING CONNECTIONS SHALL BE INSPECTED FOR TIGHTNESS. EXOTHERMIC WELDED CONNECTIONS SHALL BE APPROVED BY THE INSPECTOR HAVING JURISDICTION BEFORE BEING PERMANENTLY CONCEALED.
8. APPLY CORROSION-RESISTANT FINISH TO FIELD CONNECTIONS AND PLACES WHERE FACTORY APPLIED PROTECTIVE COATINGS HAVE BEEN DESTROYED. USE KOPR-SHIELD ANTI-OXIDATION COMPOUND ON ALL COMPRESSION GROUNDING CONNECTIONS.
9. A SEPARATE, CONTINUOUS, INSULATED EQUIPMENT GROUNDING CONDUCTOR SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUITS.
10. BOND ALL INSULATED GROUNDING BUSHINGS WITH A BARE #6 AWG GROUNDING CONDUCTOR TO A GROUND BUS.
11. DIRECT BURIED GROUNDING CONDUCTORS SHALL BE INSTALLED AT A NOMINAL DEPTH OF 36" MINIMUM BELOW GRADE, OR 6" BELOW THE FROST LINE, USE THE GREATER OF THE TWO DISTANCES.
12. ALL GROUNDING CONDUCTORS EMBEDDED IN OR PENETRATING CONCRETE SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT.
13. THE INSTALLATION OF CHEMICAL ELECTROLYTIC GROUNDING SYSTEM IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. REMOVE SEALING TAPE FROM LEACHING AND BREATHER HOLES. INSTALL PROTECTIVE BOX FLUSH WITH GRADE.
14. DRIVE GROUND RODS UNTIL TOPS ARE A MINIMUM DISTANCE OF 36" DEPTH OR 6" BELOW FROST LINE, USING THE GREATER OF THE TWO DISTANCES.
15. IF COAX ON THE ICE BRIDGE IS MORE THAN 6 FT. FROM THE GROUNDING BAR AT THE BASE OF THE TOWER, A SECOND GROUNDING BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE, TO GROUND THE COAX CABLE GROUNDING KITS AND IN-LINE ARRESTORS.
16. CONTRACTOR SHALL REPAIR, AND/OR REPLACE, EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.

3.5 ACCEPTANCE TESTING:

A. CERTIFIED PERSONNEL USING CERTIFIED EQUIPMENT SHALL PERFORM REQUIRED TESTS AND SUBMIT WRITTEN TEST REPORTS UPON COMPLETION.

B. WHEN MATERIAL AND/OR WORKMANSHIP IS FOUND NOT TO COMPLY WITH THE SPECIFIED REQUIREMENTS, THE NON-COMPLYING ITEMS SHALL BE REMOVED FROM THE PROJECT SITE AND REPLACED WITH ITEMS COMPLYING WITH THE SPECIFIED REQUIREMENTS PROMPTLY AFTER RECEIPT OF NOTICE FOR NON-COMPLIANCE.

C. TEST PROCEDURES:

1. ALL FEEDERS SHALL HAVE INSULATION TESTED AFTER INSTALLATION, BEFORE CONNECTION TO DEVICES. THE CONDUCTORS SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS. TESTING SHALL BE FOR ONE MINUTE USING 1000V DC. PROVIDE WRITTEN DOCUMENTATION FOR ALL TEST RESULTS.
2. PRIOR TO ENERGIZING CIRCUITRY, TEST WIRING DEVICES FOR ELECTRICAL CONTINUITY AND PROPER POLARITY CONNECTIONS.
3. MEASURE AND RECORD VOLTAGES BETWEEN PHASES AND BETWEEN PHASE CONDUCTORS AND NEUTRALS. SUBMIT A REPORT OF MAXIMUM AND MINIMUM VOLTAGES.
4. PERFORM GROUNDING TEST TO MEASURE GROUNDING RESISTANCE OF GROUNDING SYSTEM USING THE IEEE STANDARD 3-POINT "FALL-OF-POTENTIAL" METHOD. PROVIDE PLOTTED TEST VALUES AND LOCATION SKETCH. NOTIFY THE ENGINEER IMMEDIATELY IF MEASURED VALUE IS OVER 5 OHMS.

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: EP4TURNL

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

GENERAL NOTES I

GN-1

ANTENNA MOUNTING

1. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA-222 OR APPLICABLE LOCAL CODES.
2. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
3. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
4. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
5. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
6. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
7. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50-OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
8. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/- 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/- 0.5% AS DEFINED BY THE RFDS. REFER TO ND-00246.
9. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
10. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
11. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

12. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
13. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.
    C. ALL 8M ANTENNA HARDWARE SHALL BE TIGHTENED TO 9 LB-FT (12 NM).
14. ALL 12M ANTENNA HARDWARE SHALL BE TIGHTENED TO 43 LB-FT (58 NM).
15. ALL GROUNDING HARDWARE SHALL BE TIGHTENED UNTIL THE LOCK WASHER COLLAPSES AND THE GROUNDING HARDWARE IS NO LONGER LOOSE.
16. ALL DIN TYPE CONNECTIONS SHALL BE TIGHTENED TO 18-22 LB-FT (24.4 - 29.8 NM).
17. ALL N TYPE CONNECTIONS SHALL BE TIGHTENED TO 15-20 LB-IN (1.7 - 2.3 NM).

FIBER & POWER CABLE MOUNTING

18. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
19. THE TYPE TC-ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC-ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
20. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC-ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

21. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
22. CONTRACTOR SHALL VERIFY THE DOWN-TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
23. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION. REFER TO "ANTENNA SYSTEM LABELING STANDARD" ND-00027 LATEST VERSION.
24. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'-0".
25. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'-0" O.C.
26. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
27. CONTRACTOR SHALL WEATHERPROOF ALL ANTENNA CONNECTORS WITH SELF AMALGAMATING TAPE. WEATHERPROOFING SHALL BE COMPLETED IN STRICT ACCORDANCE WITH AT&T STANDARDS.
28. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
29. CONTRACTOR SHALL PROVIDE STRAIN-RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN-RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
30. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

31. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
32. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
33. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
34. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE-HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
35. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS.
36. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'-0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
37. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND
38. BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.
39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ANTENNA AND THE COAX CONFIGURATION IS THE CORRECT MAKE AND MODELS, PRIOR TO INSTALLATION.
40. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S SPECIFICATION & RECOMMENDATIONS.
41. ANTENNA CONTRACTOR SHALL FURNISH AND INSTALL A 12'-0" T-BOOM SECTOR ANTENNA MOUNT, IF APPLICABLE, INCLUDING ALL HARDWARE.

GROUNDING NOTES

42. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
43. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND AT&T GROUNDING AND BONDING REQUIREMENTS (ATT-TP-76416) AND MANUFACTURER'S SPECIFICATIONS.
44. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
45. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUNDING KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200', ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
46. ALL PROPOSED GROUNDING BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUNDING BAR DOWNLEADS A MINIMUM DISTANCE OF 4'-0" BELOW GROUNDING BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM (T)
EXOTHERMIC WITH INSPECTION SLEEVE
GROUNDING BAR
SHELTER GROUNDING BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE (T)
SINGLE POLE SWITCH ($)
DUPLEX RECEPTACLE
DUPLEX GFCI RECEPTACLE (GFCI)
FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8 (F)
EXISTING SMOKE DETECTION (DC) (SD)
EXISTING EMERGENCY LIGHTING (DC)
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD
EXISTING UTILITY POLE

CALLOUT REFERENCE (X)
REVISION REFERENCE (1)
WORKPOINT (W.P.)
SECTION REFERENCE (XX / X-X)
DETAIL REFERENCE (XX / X-X)
ELEVATION REFERENCE (X / X)

EXISTING CHAIN LINK FENCE — X — X — X — X —
EXISTING WOOD/WROUGHT IRON FENCE
EXISTING WALL STRUCTURE
LEASE AREA
PROPERTY LINE (PL)
SETBACKS
PROPOSED/EXISTING ICE BRIDGE
PROPOSED/EXISTING CABLE TRAY
EXISTING WATER LINE
PROPOSED UNDERGROUND POWER — W — W — W — W — W —
PROPOSED UNDERGROUND TELCO — UGP — UGP — UGP — UGP —
PROPOSED OVERHEAD POWER — UGT — UGT — UGT — UGT —
PROPOSED OVERHEAD TELCO — OHP — OHP — OHP — OHP —
PROPOSED OVERHEAD UTILITIES — OHT — OHT — OHT — OHT — OHT —
PROPOSED ABOVE GROUND POWER — OHT — OHT — OHT — OHT — OHT —
PROPOSED ABOVE GROUND TELCO — AGP — AGP — AGP — AGP — AGP —
— AGT — AGT — AGT — AGT — AGT —

AB	ANCHOR BOLT	COL	COLUMN	FIN	FINISH(ED)	MAS	MASONRY	QTY	QUANTITY	TOF	TOP OF FOUNDATION
ABV	ABOVE	COMM	COMMON	FLR	FLOOR	MAX	MAXIMUM	RAD	RADIUS	TOP	TOP OF PLATE (PARAPET)
AC	ALTERNATING CURRENT	CONC	CONCRETE	FDN	FOUNDATION	MB	MACHINE BOLT	RECT	RECTIFIER	TOS	TOP OF STEEL
ADDL	ADDITIONAL	CONSTR	CONSTRUCTION	FOC	FACE OF CONCRETE	MECH	MECHANICAL	REF	REFERENCE	TOW	TOP OF WALL
AFF	ABOVE FINISHED FLOOR	DBL	DOUBLE	FOM	FACE OF MASONRY	MFR	MANUFACTURER	REINF	REINFORCEMENT	TVSS	TRANSIENT VOLTAGE SUPPRESSION
AFG	ABOVE FINISHED GRADE	DC	DIRECT CURRENT	FOS	FACE OF STUD	MGB	MASTER GROUND BAR	REQ'D	REQUIRED		SYSTEM
AIC	AMPERAGE INTERRUPTION CAPACITY	DEPT	DEPARTMENT	FOW	FACE OF WALL	MIN	MINIMUM	RET	REMOTE ELECTRIC TILT	TYP	TYPICAL
ALUM	ALUMINUM	DF	DOUGLAS FIR	FS	FINISH SURFACE	MISC	MISCELLANEOUS	RMC	RIGID METALLIC CONDUIT	UG	UNDERGROUND
ALT	ALTERNATE	DIA	DIAMETER	FT	FOOT	MTL	METAL	RRH	REMOTE RADIO HEAD	UL	UNDERWRITERS LABORATORY
ANT	ANTENNA	DIAG	DIAGONAL	FTG	FOOTING	MTS	MANUAL TRANSFER SWITCH	RRU	REMOTE RADIO UNIT	UNO	UNLESS NOTED OTHERWISE
APPROX	APPROXIMATE	DIM	DIMENSION	GA	GAUGE	MW	MICROWAVE	RWY	RACEWAY	UMTS	UNIVERSAL MOBILE
ARCH	ARCHITECTURAL	DWG	DRAWING	GEN	GENERATOR	(N)	NEW	SCH	SCHEDULE		TELECOMMUNICATIONS SYSTEM
ATS	AUTOMATIC TRANSFER SWITCH	DWL	DOWEL	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NEC	NATIONAL ELECTRIC CODE	SHT	SHEET	UPS	UNINTERRUPTIBLE POWER SYSTEM
AWG	AMERICAN WIRE GAUGE	(E)	EXISTING	GLB	GLUE LAMINATED BEAM	NO.(#)	NUMBER	SIAD	SMART INTEGRATED DEVICE		(DC POWER PLANT)
BATT	BATTERY	EA	EACH	GLV	GALVANIZED	NTS	NOT TO SCALE	SIM	SIMILAR	VIF	VERIFIED IN FIELD
BLDG	BUILDING	EC	ELECTRICAL CONDUCTOR	GPS	GLOBAL POSITIONING SYSTEM	OC	ON CENTER	SPEC	SPECIFICATION	W	WIDE
BLK	BLOCK	EL	ELEVATION	GND	GROUND	OPNG	OPENING	SQ	SQUARE	W/	WITH
BLKG	BLOCKING	ELEC	ELECTRICAL	GSM	GLOBAL SYSTEM FOR MOBILE	(P)	PROPOSED	SS	STAINLESS STEEL	WD	WOOD
BM	BEAM	EMT	ELECTRICAL METALLIC TUBING	HDR	HEADER	P/C	PRECAST CONCRETE	STD	STANDARD	W.P.	WORK POINT
BTC	BARE TINNED COPPER CONDUCTOR	ENG	ENGINEER	HGR	HANGER	PCS	PERSONAL COMMUNICATION SERVICES	STL	STEEL	WP	WEATHERPROOF
BOF	BOTTOM OF FOOTING	EQ	EQUAL	HVAC	HEAT/VENTILATION/AIR CONDITIONING	PCU	PRIMARY CONTROL UNIT	STRUCT	STRUCTURAL	WT	WEIGHT
CAB	CABINET	EXP	EXPANSION	HT	HEIGHT	PRC	PRIMARY RADIO CABINET	TEMP	TEMPORARY		
CANT	CANTILEVERED	EXT	EXTERIOR	IGR	INTERIOR GROUND RING	PP	POLARIZING PRESERVING	THK	THICKNESS		
CEC	CALIFORNIA ELECTRIC CODE	FAB	FABRICATION	IN	INCH	PSF	POUNDS PER SQUARE FOOT	TMA	TOWER MOUNTED AMPLIFIER		
CHG	CHARGING	FF	FINISH FLOOR	INT	INTERIOR	PSI	POUNDS PER SQUARE INCH	TN	TOE NAIL		
CLG	CEILING	FG	FINISH GRADE	LB(S)	POUND(S)	PT	PRESSURE TREATED	TOA	TOP OF ANTENNA		
CLR	CLEAR	FIF	FACILITY INTERFACE FRAME	LF	LINEAR FEET	PWR	POWER CABINET	TOC	TOP OF CURB		

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: EP4TURNL

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

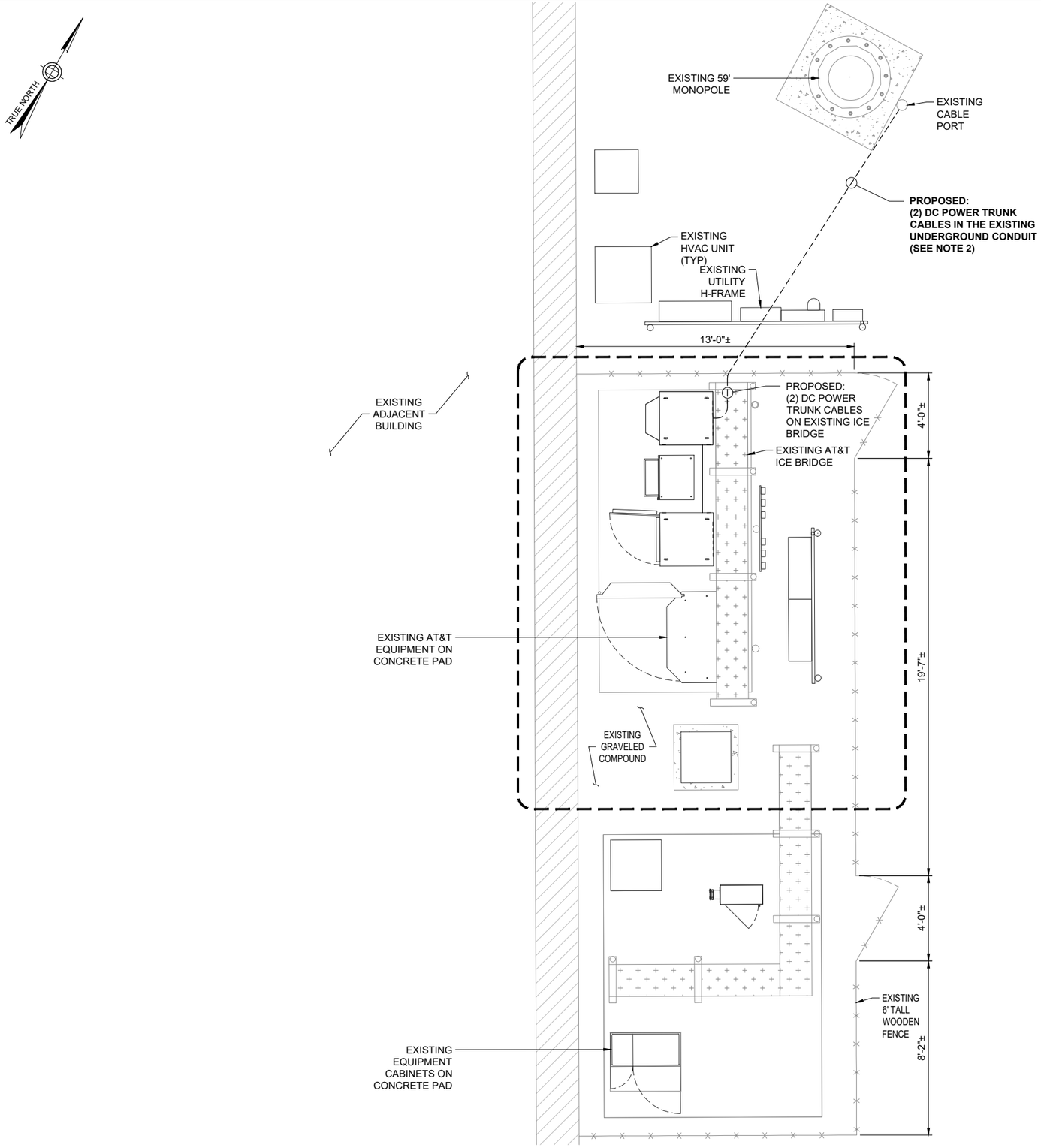
2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

GENERAL NOTES II

GN-2



NOTES:

1. PLAN BASED ON AS-BUILT DRAWINGS ISSUED BY DEWBERRY ENGINEERS, INC. ON 04/18/18. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND LOCATION/ORIENTATION OF EXISTING EQUIPMENT.
2. CONTRACTOR SHALL NOTIFY ENGINEER IF PROPOSED CABLES CANNOT BE INSTALLED IN THE EXISTING UNDERGROUND CONDUIT.

1 SITE PLAN

SCALE: 3/8" = 1'-0"

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO:	EP4TURNL
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

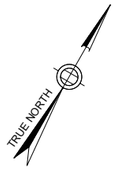
2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

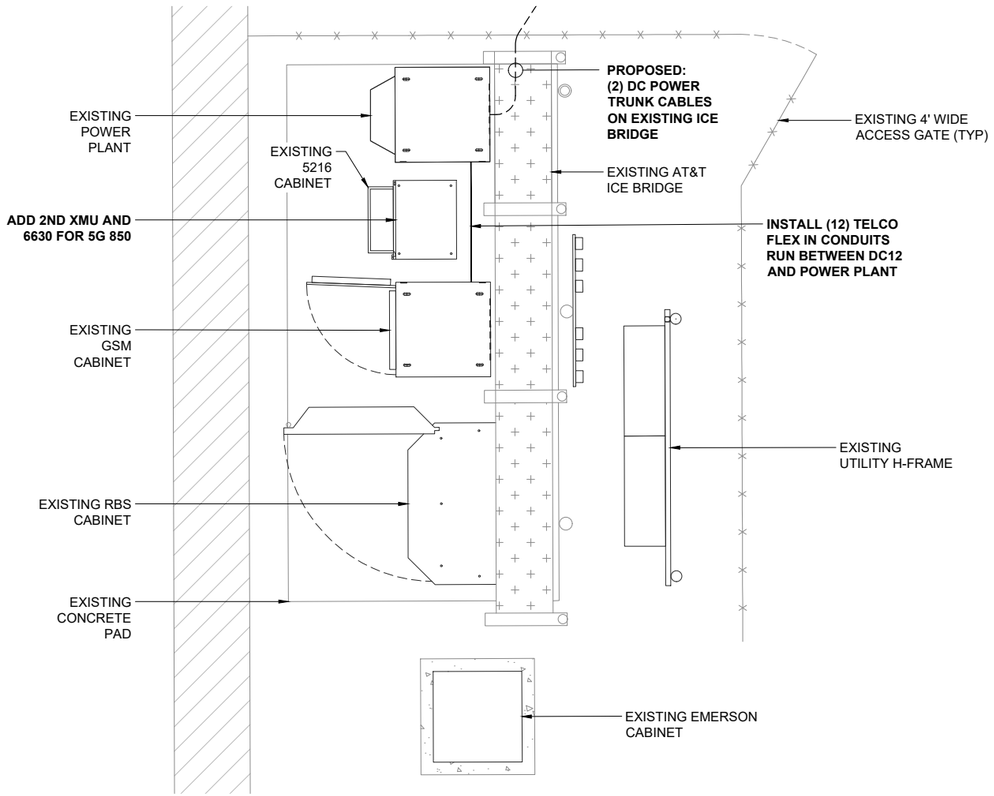
SITE PLAN

C-1

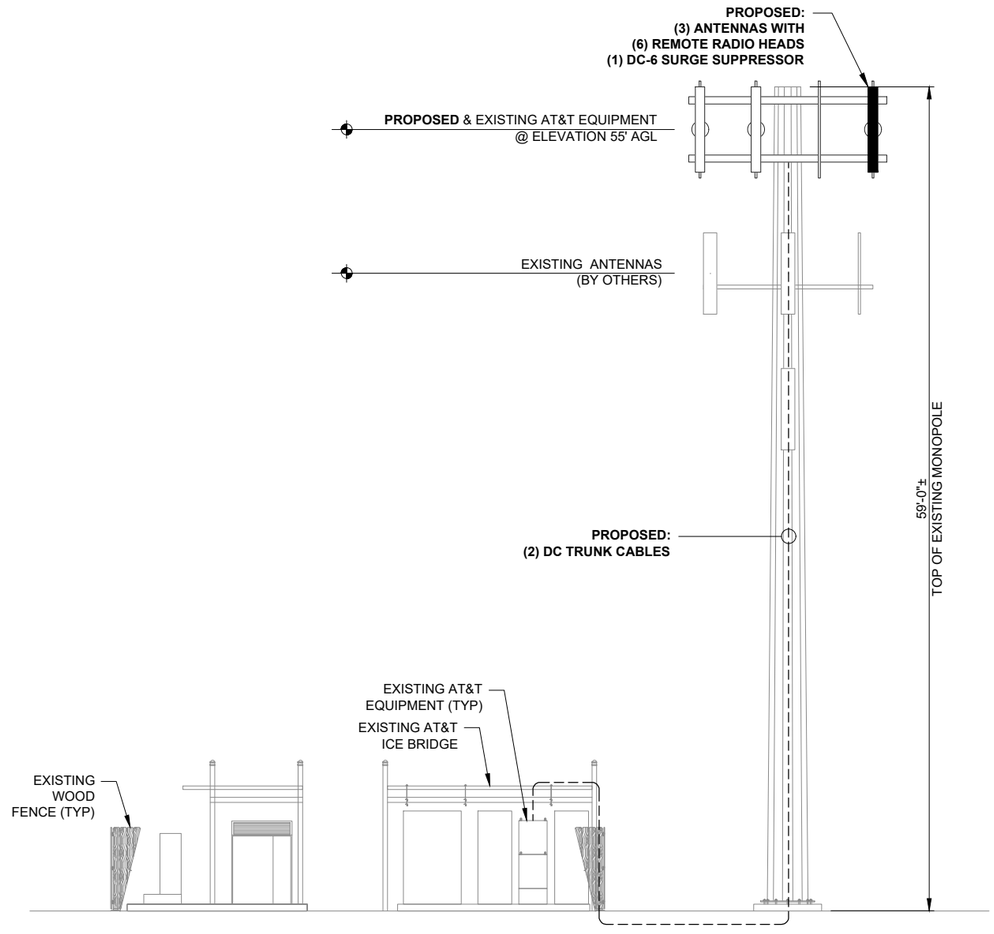


NOTES:

1. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
2. AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.
3. THESE DRAWINGS ARE NOT INTENDED TO REFLECT THE STRUCTURAL INTEGRITY OF THE TOWER. THE PROPOSED ANTENNAS AND TRANSMISSION LINES SHOWN ARE REPRESENTATIVE IN NATURE AND DO NOT REFLECT THE ACTUAL CONFIGURATIONS REQUIRED. THE CONTRACTOR SHALL REFER TO THE STRUCTURAL ANALYSIS OF THIS TOWER SITE FOR THE APPROVED LOCATION AND CONFIGURATION OF ALL ANTENNAS AND TRANSMISSION LINES. ALL ANTENNAS MUST BE MOUNTED AND THE TRANSMISSION LINES CONFIGURED IN STRICT ACCORDANCE WITH THE STRUCTURAL ANALYSIS.
4. CONTRACTOR SHALL VERIFY THE EXISTING ANTENNA CENTERLINE HEIGHT ABOVE GROUND LEVEL. PROPOSED ANTENNA CENTERLINE SHALL MATCH EXISTING.



1 EQUIPMENT LAYOUT — SCALE: 1/2" = 1'-0"



2 TOWER ELEVATION — SCALE: 3/16" = 1'-0"

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO:	EP4TURNL
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

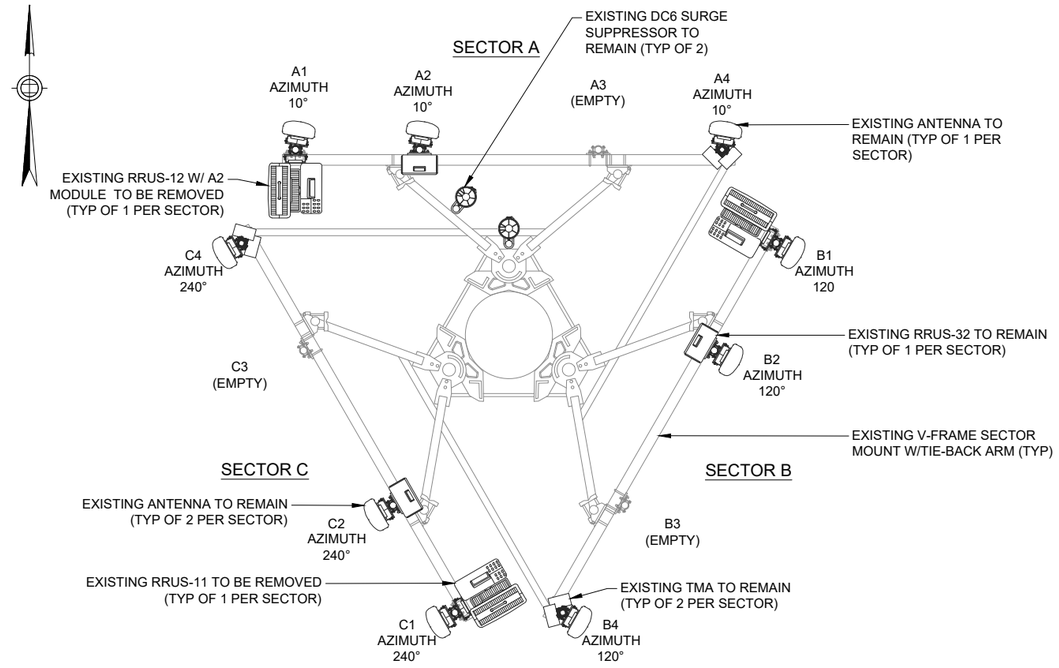
2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

EQUIPMENT LAYOUT & PROPOSED TOWER ELEVATION

C-2



ELEVATION 55'

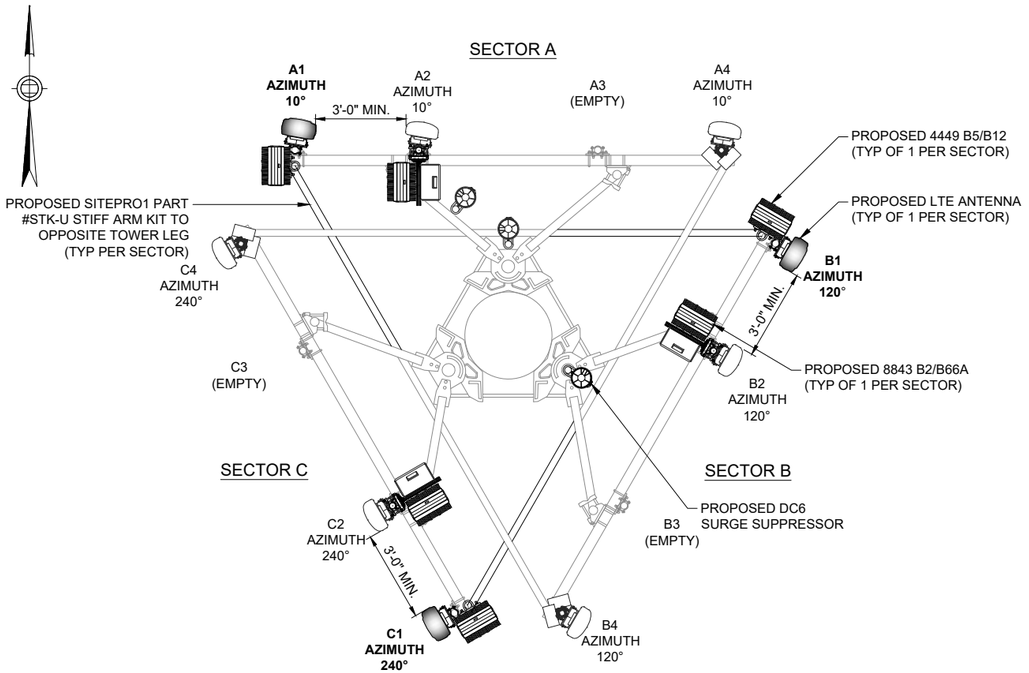
1 EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

NOTES:

1. CONTRACTOR SHALL REFER TO THE MOUNT MODIFICATION REPORT; SITE NUMBER: CTL05048; SITE NAME: EAST HAVEN SOUTH; FA LOCATION: 10071016; CROWN BU NUMBER: 842862; CROWN SITE NAME: EAST HAVEN SOUTH; CROWN ORDER NUMBER: 471828; ISSUED BY INFINIGI. DATED ON 01/24/19. THE MOUNT MODIFICATIONS MUST BE PERFORMED PRIOR TO THE INSTALLATION OF THE EQUIPMENT SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL VERIFY ALL EXISTING MEMBERS AND HARDWARE ARE ISNTALLED PROPERLY AS DESCRIBED IN THIS REPORT.
2. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.
3. CONTRACTOR SHALL NOT EXCEED MOUNTING MORE THAN (2) RRHS PER ANTENNA MOUNTING PIPE - RELOCATE TO AN ADJACENT ANTENNA MOUNTING PIPE AS NEEDED.
4. CONTRACTOR TO VERIFY FINAL RF CONFIGURATION AND NOTIFY CARRIER AND ENGINEER W/ ANY DISCREPANCIES PRIOR TO THE INSTALLATION.

DO NOT INSTALL PROPOSED SQUID OR SURGE SUPPRESSOR ON TOWER LEG



ELEVATION 55'

1 PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO:	EP4TURNL
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

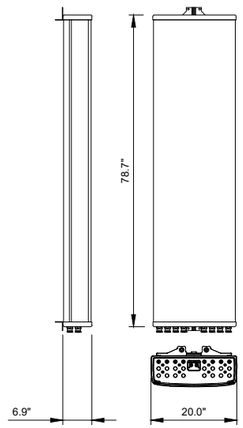
FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

EXISTING & PROPOSED ANTENNA LAYOUT

C-3

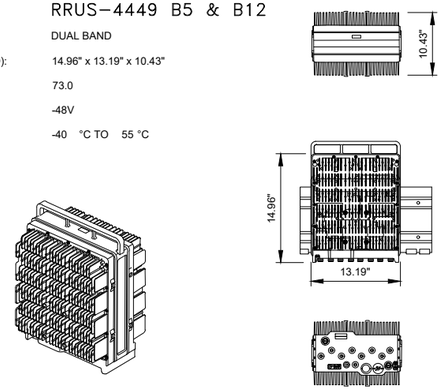
MANUFACTURER:	KATHREIN
MODEL NO.:	80010965
RADOME MATERIAL:	FIBERGLASS, UV RESISTANT
COLOR:	LIGHT GRAY
DIMENSIONS (LxWxD):	78.7" x 20.0" x 6.9" 1999mm x 508mm x 175mm
WEIGHT (lbs):	97.6
CONNECTOR:	8 x 4.3-10 FEMALE
FRONT WIND LOAD:	254 LBF @ 93 MPH 1130 N @ 150 KM/H
SIDE WIND LOAD:	256 LBF @ 93 MPH 1140 N @ 150 KM/H
WIND SPEED MAX.:	>150 MPH (>241 KM/H)



1 ANTENNA SPECIFICATIONS

SCALE: N.T.S.

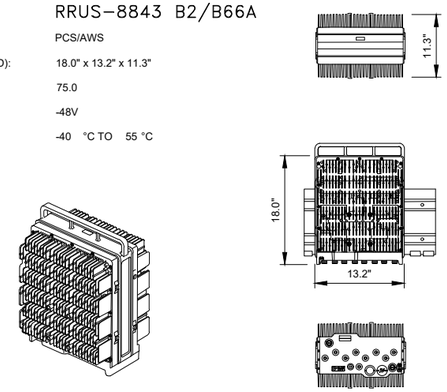
MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-4449 B5 & B12
TECHNOLOGY:	DUAL BAND
DIMENSIONS (HxWxD):	14.96" x 13.19" x 10.43"
WEIGHT (lbs):	73.0
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C



2 RRUS SPECIFICATIONS

SCALE: N.T.S.

MANUFACTURER:	ERICSSON
MODEL NO.:	RRUS-8843 B2/B66A
	PCS/AWS
DIMENSIONS (HxWxD):	18.0" x 13.2" x 11.3"
WEIGHT (lbs):	75.0
POWER SUPPLY:	-48V
TEMPERATURE:	-40 °C TO 55 °C

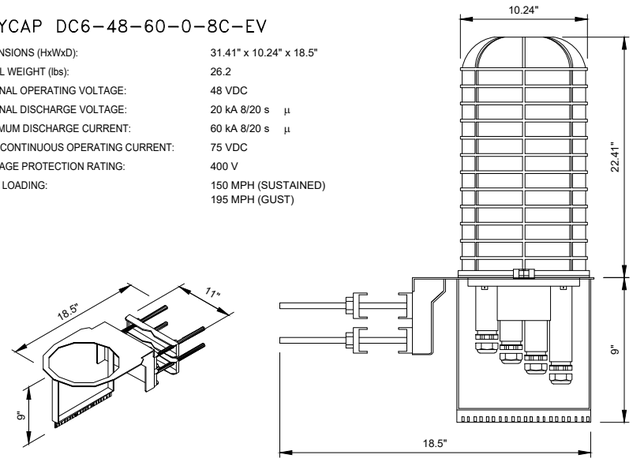


3 RRUS SPECIFICATIONS

SCALE: N.T.S.

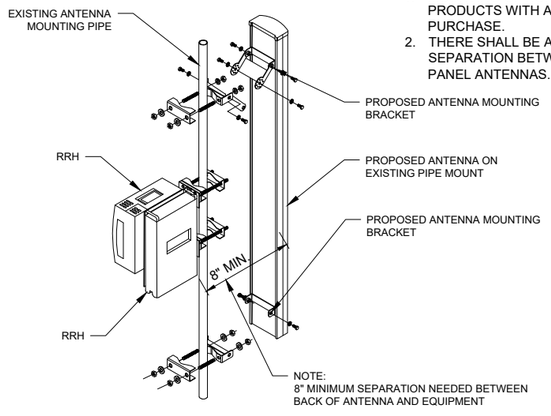
RAYCAP DC6-48-60-0-8C-EV

DIMENSIONS (HxWxD):	31.41" x 10.24" x 18.5"
TOTAL WEIGHT (lbs):	26.2
NOMINAL OPERATING VOLTAGE:	48 VDC
NOMINAL DISCHARGE VOLTAGE:	20 kA 8/20 s μ
MAXIMUM DISCHARGE CURRENT:	60 kA 8/20 s μ
MAX. CONTINUOUS OPERATING CURRENT:	75 VDC
VOLTAGE PROTECTION RATING:	400 V
WIND LOADING:	150 MPH (SUSTAINED) 195 MPH (GUST)



4 DC SURGE PROTECTION SPECIFICATIONS

SCALE: N.T.S.



NOTES:

1. MOUNTING OPTIONS ARE INCLUDED PRODUCTS WITH ANTENNA PURCHASE.
2. THERE SHALL BE A MINIMUM 3'-0" SEPARATION BETWEEN ALL LTE PANEL ANTENNAS.

5 ANTENNA & RRH MOUNTING DETAIL

SCALE: N.T.S.

6 NOT USED

SCALE: N.T.S.

7 NOT USED

SCALE: N.T.S.

8 NOT USED

SCALE: N.T.S.

9 NOT USED

SCALE: N.T.S.

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO:	EP4TURNL
DRAWN BY:	DAP
CHECKED BY:	CAT

SUBMITTALS

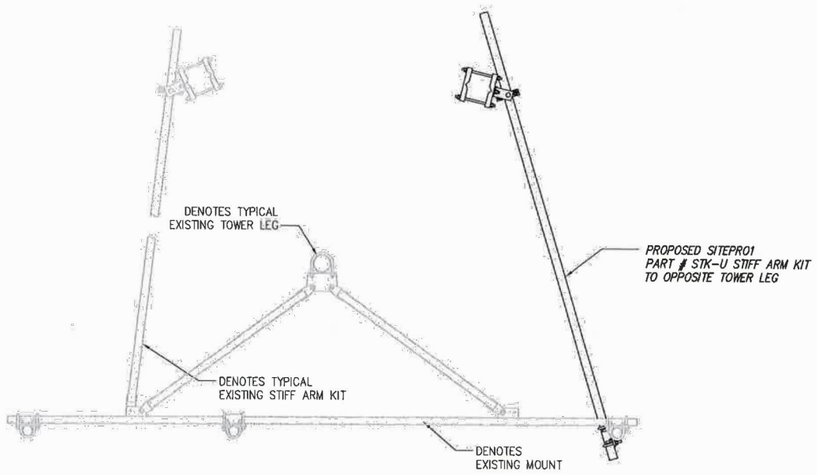
2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

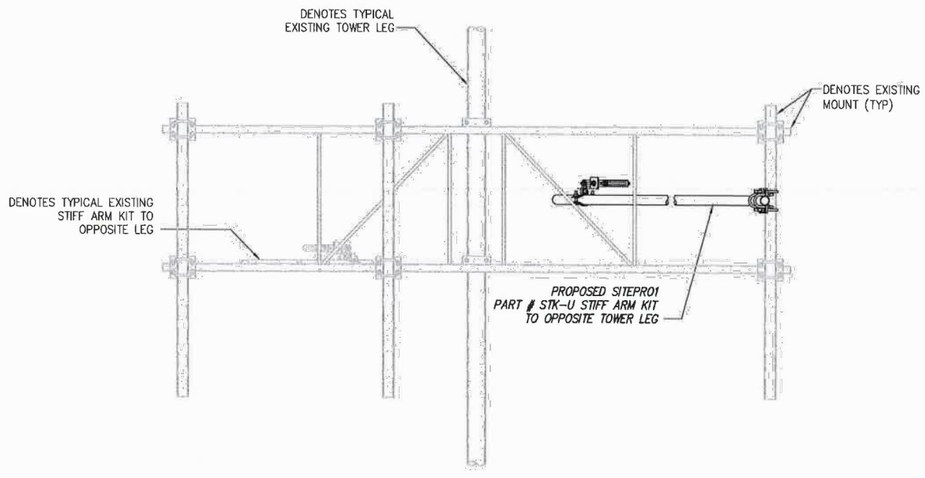
259 COMMERCE STREET
EASTHAVEN, CT 06512

EQUIPMENT DETAILS I

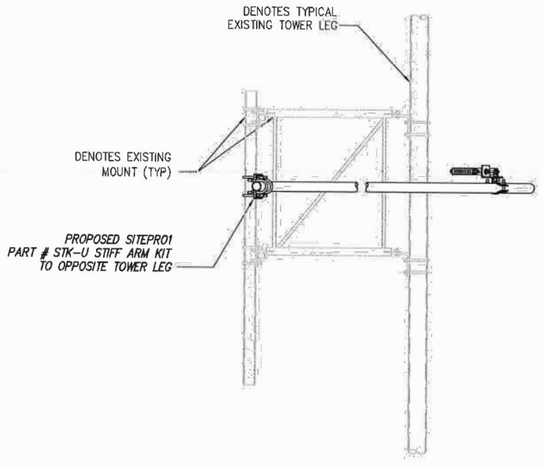
C-4



1 TOP VIEW
SCALE: NOT TO SCALE



2 ELEVATION VIEW
SCALE: NOT TO SCALE



3 SIDE VIEW
SCALE: NOT TO SCALE

1 MOUNT MODIFICATION DETAIL

SCALE: N.T.S.

INFINIGY
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

at&t

STATE OF CONNECTICUT
JOSEPH R. JOHNSTON
29460
LICENSED
PROFESSIONAL ENGINEER
Joseph R. Johnston
JAN 22 2019

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR REVIEW	VEB	01/22/19

Drawn: VEB Date: 01/22/19
Designed: GLK Date: 01/22/19
Checked: NRG Date: 01/22/19

Project Number:
1039-A0002-B

Project Title:
BU# 842862
FA# 10071016

EAST HAVEN SOUTH

259 COMMERCE RD
EAST HAVEN, CT 06512

Prepared For:

CROWN CASTLE
3 Corporate Park, Suite 101
Clifton Park, NY 12065

Drawing Scale:
AS NOTED

Date:
01/22/19

Drawing Title
MOUNT MODIFICATION

Drawing Number
S-2

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED
PROFESSIONAL ENGINEER

PROJECT NO: EP4TURNL

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

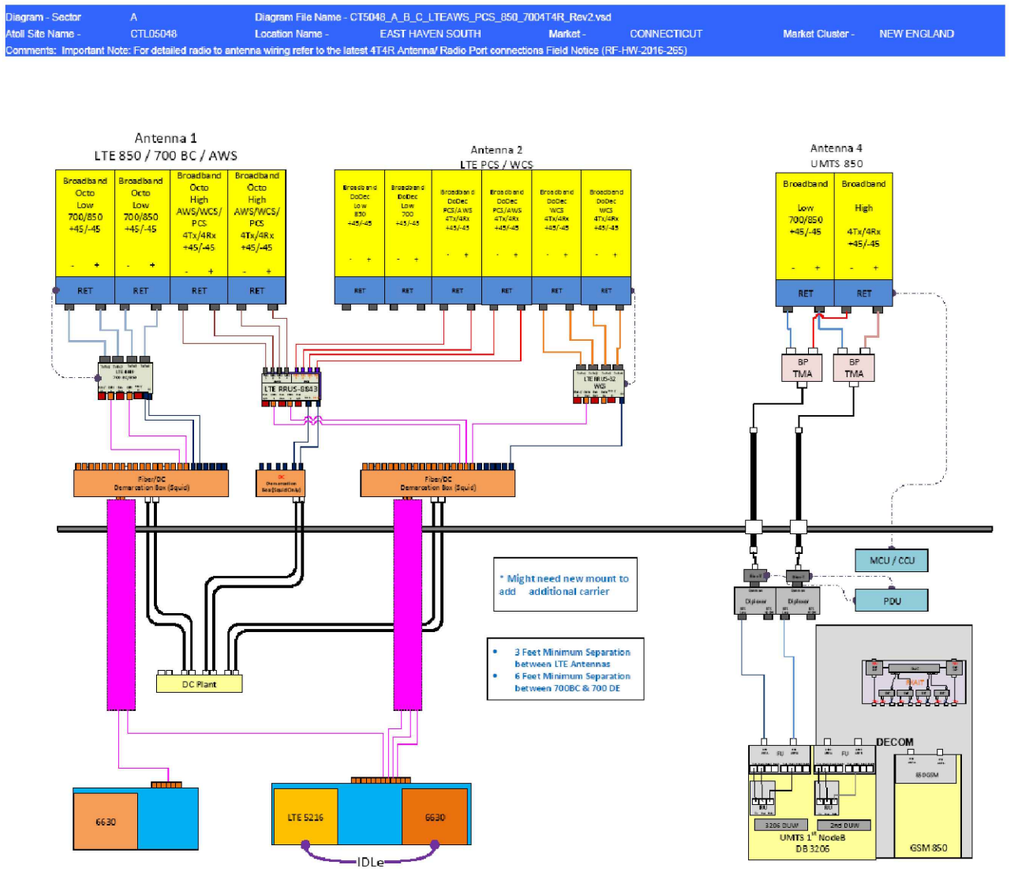
MOUNT MODIFICATION DETAIL

S-1

ANTENNA NUMBER	ANTENNA MODEL	ANTENNA BAND	AZIMUTH	ANTENNA CENTERLINE FROM GROUND	TMA's & DIPLEXERS	RRH's	FEEDER	RAYCAP
A1	**800-10965 (78.7"x20"x6.9")**	**LTE**	**10°**	**55'**	-	**(1) B5/B12 4449 (700/850)**	-	**(1) RAYCAP DC6-48-60-0-8C-EV**
A2	QS66512-6 (72"x12"x9.6")	LTE	10°	55'	-	**(1) B2/B66A 8843 (AWS/PCS)** (1) RRUS-32 (WCS)	-	
A3	-	-	10°	55'	-	-	-	(2) RAYCAP DC6-48-60-18-8C
A4	800-10121 (54.5"x10.3"x5.9")	UMTS	10°	55'	(2) LGP 21401	-	(2) 7/8" EXISTING (LENGTH @ 90')	
B1	**800-10965 (78.7"x20"x6.9")**	**LTE**	**120°**	**55'**	-	**(1) B5/B12 4449 (700/850)**	-	
B2	QS66512-6 (72"x12"x9.6")	LTE	120°	55'	-	**(1) B2/B66A 8843 (AWS/PCS)** (1) RRUS-32 (WCS)	-	
B3	-	-	120°	55'	-	-	-	
B4	800-10121 (54.5"x10.3"x5.9")	UMTS	120°	55'	(2) LGP 21401	-	(2) 7/8" EXISTING (LENGTH @ 90')	
G1	**800-10965 (78.7"x20"x6.9")**	**LTE**	**240°**	**55'**	-	**(1) B5/B12 4449 (700/850)**	-	
G2	QS66512-6 (72"x12"x9.6")	LTE	240°	55'	-	**(1) B2/B66A 8843 (AWS/PCS)** (1) RRUS-32 (WCS)	-	
G3	-	-	240°	55'	-	-	-	
G4	800-10121 (54.5"x10.3"x5.9")	UMTS	240°	55'	(2) LGP 21401	-	(2) 7/8" EXISTING (LENGTH @ 90')	

*EQUIPMENT LISTED IN **BOLD**, DELINEATES THAT THE EQUIPMENT IS PROPOSED

1 ANTENNA INFORMATION CHART — SCALE: NONE



2 RF EQUIPMENT SCHEMATIC — SCALE: NONE

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: EP4TURNL

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

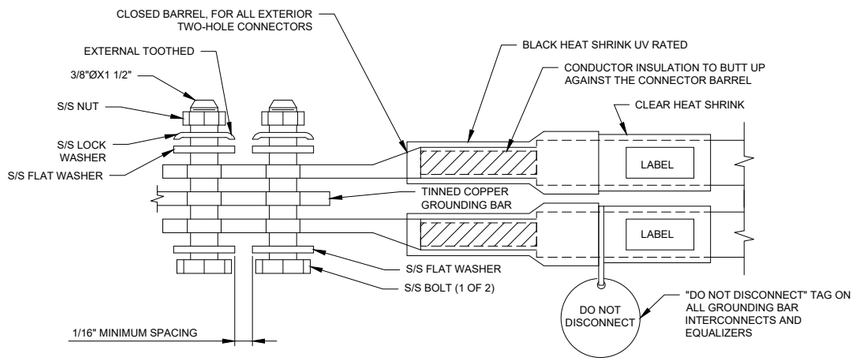
259 COMMERCE STREET
EASTHAVEN, CT 06512

ANTENNA CHART & RF EQUIPMENT SCHEMATIC

RF-1

NOTES:

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL GROUNDING BARS SHALL BE STAMPED IN TO THE METAL "IF STOLEN DO NOT RECYCLE." THE CONTRACTOR SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "I") WITH 1" HIGH LETTERS.
3. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUNDING CONDUCTOR DOWN TO GROUNDING BUS.
6. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
7. SUPPLIED AND INSTALLED BY CONTRACTOR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BAR AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).



1 EXTERIOR TWO HOLE LUG DETAIL

SCALE: NONE

GENERAL NOTES:

1. CONTRACTOR SHALL HAVE A COMPLETE UNDERSTANDING OF THE CONTENTS OF AT&T STANDARD TP-76416.
2. ALL INSTALLATIONS SHALL BE FIELD VERIFIED.
3. ALL GROUND CONNECTIONS FOR ALL RELOCATED EQUIPMENT SHALL BE RE-ESTABLISHED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.

GROUNDING NOTES:

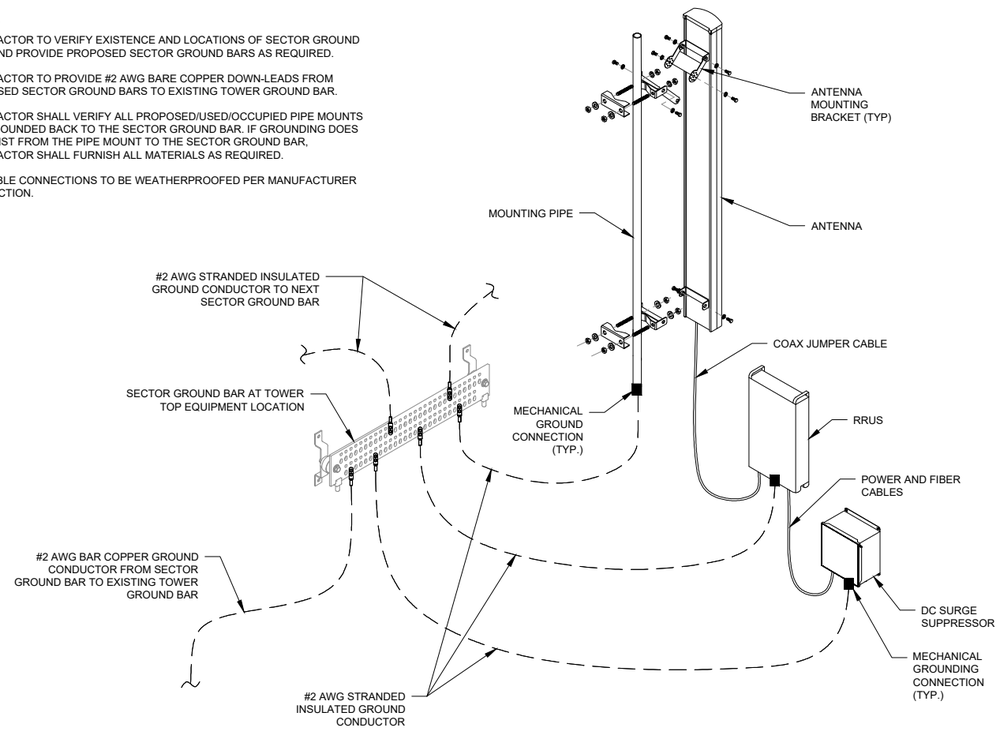
1. TOWER GROUNDING BAR: EXTEND (2) #2 AWG TINNED CU WIRE FROM BURIED GROUND RING UP TO THE TOWER GROUND BAR AND MAKE A MECHANICAL CONNECTION. SECURE GROUND BAR DIRECTLY TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
2. ANTENNA GROUNDING BAR: ANDREW CORPORATION PART #UGBKIT-0424-T MOUNT GROUND BAR DIRECTLY TO TOWER. SECURE TO TOWER WITH STAINLESS STEEL MOUNTING MATERIAL.
3. GROUNDING BAR: LOCATED CLOSE TO GRADE LOCK BOX TESSCO PART #351546: INSTALL PER MANUFACTURER GUIDELINES.
4. EXOTHERMIC OR COMPRESSION CONNECTION FOR PIPE MOUNT TO ANTENNA ROUTE CONDUCTOR TO NEAREST GROUNDING BAR SO THE GROUNDING CONDUCTORS PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND. USE #2 AWG SOLID TINNED COPPER CONDUCTOR. GROUNDING CONNECTION SHALL BE LOCATED AT THE TOP 2" OF PIPE.
5. ALL GROUNDING CONDUCTORS SHALL BE #2 AWG COPPER TINNED UNLESS NOTED OTHERWISE.
6. ALL GROUNDING CONDUCTORS SHALL PROVIDE A STRAIGHT DOWNWARD PATH TO GROUND WITH GRADUAL BEND AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
7. KOPR-SHIELD ANTI-OXIDATION COMPOUND SHALL BE USED ON ALL COMPRESSION GROUNDING CONNECTIONS.
8. ALL EXOTHERMIC CONNECTIONS SHALL BE INSTALLED UTILIZING THE PROPER CONNECTION/MOLD AND MATERIALS FOR THE PARTICULAR APPLICATION.
9. ALL BOLTED GROUNDING CONNECTIONS SHALL BE INSTALLED WITH AN EXTERNAL TOOTHED LOCK WASHER. GROUNDING BUS BARS MAY HAVE PRE-PUNCHED HOLES OR TAPPED HOLES. ALL HARDWARE SHALL BE SECURITY TORQUE HARDWARE 3/8" STAINLESS STEEL.
10. EXTERNAL GROUNDING CONDUCTOR SHALL NOT BE INSTALLED OR ROUTED THROUGH HOLES IN ANY METAL OBJECTS, CONDUITS, OR SUPPORTS TO PRECLUDE ESTABLISHING A MAGNETIC CHOKE POINT.
11. PLASTIC CLIPS SHALL BE USED TO FASTEN AND SUPPORT GROUNDING CONDUCTORS. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL NOT BE USED.
12. IF COAX ON ICE BRIDGE IS MORE THAT 6' FROM THE GROUND BAR AT THE BASE OF THE TOWER, A SECOND GROUND BAR WILL BE NEEDED AT THE END OF THE ICE BRIDGE RUN TO GROUND THE COAX GROUND KIT AND THE IN-LINE SURGE ARRESTORS (SURGE ARRESTORS INSTALLED BY LUCENT ONLY HAVE 6' GROUND TAILS).
13. CONTRACTOR SHALL REPAIR/PLACE EXISTING GROUNDING SYSTEM COMPONENTS DAMAGED DURING CONSTRUCTION AT THE CONTRACTORS EXPENSE.
14. DO NOT ALLOW THE COPPER CONDUCTOR TO TOUCH THE GALVANIZED GUY WIRE AT THE CONNECTION POINT OR AT ANY OTHER POINT. NO EXOTHERMICALLY WELDED CONNECTION SHALL BE MADE TO THE GUY WIRE.
15. CONTRACTOR SHALL VERIFY EXISTING SECTOR GROUNDING CONDITION AND GROUND THE PROPOSED EQUIPMENT IN THE SAME MANNER. A PROPOSED SECTOR GROUND BAR SHALL BE INSTALLED IF REQUIRED.

2 GROUNDING BAR DETAIL

SCALE: NONE

NOTES:

1. CONTRACTOR TO VERIFY EXISTENCE AND LOCATIONS OF SECTOR GROUND BARS AND PROVIDE PROPOSED SECTOR GROUND BARS AS REQUIRED.
2. CONTRACTOR TO PROVIDE #2 AWG BARE COPPER DOWN-LEADS FROM PROPOSED SECTOR GROUND BARS TO EXISTING TOWER GROUND BAR.
3. CONTRACTOR SHALL VERIFY ALL PROPOSED/USED/OCCUPIED PIPE MOUNTS ARE GROUNDED BACK TO THE SECTOR GROUND BAR. IF GROUNDING DOES NOT EXIST FROM THE PIPE MOUNT TO THE SECTOR GROUND BAR, CONTRACTOR SHALL FURNISH ALL MATERIALS AS REQUIRED.
4. ALL CABLE CONNECTIONS TO BE WEATHERPROOFED PER MANUFACTURER INSTRUCTION.



3 TYPICAL ANTENNA GROUNDING SCHEMATIC

SCALE: NONE

at&t
5841 BRIDGE STREET
EAST SYRACUSE, NY 13057

CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065

JACOBS
JACOBS ENGINEERING GROUP, INC.
120 ST. JAMES AVENUE, 5TH FLOOR
BOSTON, MA 02116

STATE OF CONNECTICUT
CRAIG A. THOMAS
No. 0029052
LICENSED PROFESSIONAL ENGINEER

PROJECT NO: EP4TURNL

DRAWN BY: DAP

CHECKED BY: CAT

SUBMITTALS

2	04/16/19	NEW RFDS
1	02/12/19	ISSUED FOR CONSTRUCTION
0	12/21/18	ISSUED FOR PERMITTING

FA# 10071016
SITE# CTL05048
EAST HAVEN SOUTH

259 COMMERCE STREET
EASTHAVEN, CT 06512

GROUNDING DETAILS

G-1

Date: **April 1, 2019**

Amanda D Brown
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	10071016
	Carrier Site Name:	CTL05048
Crown Castle Designation:	**Crown Castle BU Number:**	842862
	Crown Castle Site Name:	East Haven South
	Crown Castle JDE Job Number:	548695
	Crown Castle Work Order Number:	1717925
	Crown Castle Order Number:	471828 Rev. 2
Engineering Firm Designation:	**B+T Group Project Number:**	98372.004.01
Site Data:	**259 Commerce Street, East Haven, New Haven County, CT** **Latitude *41° 15' 22.88"*, Longitude *-72° 52' 32.8"*** **58 Foot - Monopole Tower**	

Dear Amanda D Brown,

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

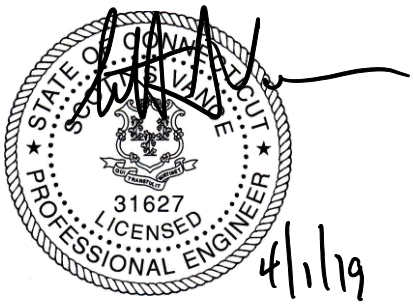
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Jacob Johnson, E.I.T.

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires:02/10/2020



Scott S. Vance, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 58 ft. Monopole tower designed by FWT, Inc. in September of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 130 mph
Exposure Category: C
Topographic Factor: 1
Ice Thickness: 0.75 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)
54.0	55.0	3	Ericsson	RRUS 32	6 6 2	7/8 3/4 3/8
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 8843 B2/B66A		
		3	Kathrein	800 10121		
		3	Kathrein	80010965		
		6	Powerwave Tech.	LGP21401		
		3	Quintel Tech.	QS66512-6		
		1	Raycap	DC6-48-60-18-8C		
		2	Raycap	DC6-48-60-18-8F		
	54.0	1	Sitepro1	STK-U Stiff-Arm Kit		
		3	Sabre	C10857011		

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)
47.0	47.0	3	Commscope	ATBT-BOTTOM-24V	6 12	1-5/8 7/8
		3	Commscope	LNX-6515DS-VTM		
		6	Ericsson	1900 MHZ G		
		3	Ericsson	KRY 112 144/1		
		3	RFS Celwave	APX16DWV-16DWVS-C		
		1	--	Platform Mount [LP 303-1]		
37.0	37.0	3	RFS Celwave	APXV18-206517S-C	6	1-5/8

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	AT&T Mobility Co-Locate Rev# 2	471828	CCI Sites
Tower Manufacturer Drawing	FWT Inc., Job No. J030902001	4291655	CCI Sites

Document	Remarks	Reference	Source
Foundation Drawing	FWT Inc., Job No. J030902001	4529325	CCI Sites
Geotech Report	Jaworski Geotech Inc., Project No.03368G	4291659	CCI Sites
Mount Modifications	Infinigy, Report Designation. 1039-A0002-B	8176772	CCI Sites
Antenna Configuration	Crown CAD Package	Date:03/27/2019	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.5.0), 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) The tower and structures were built and have been maintained in accordance with the manufacturer's specification.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	58 - 50.5	Pole	TP19.078x17.393x0.188	1	-2.467	690.552	4.8	Pass
L2	50.5 - 0	Pole	TP30.05x18.141x0.188	2	-12.104	1091.643	84.5	Pass
							Summary	
						Pole (L2)	84.5	Pass
						Rating =	84.5	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	76.7	Pass
1	Base Plate	Base	72.2	Pass
1	Base Foundation (Structure)	Base	37.1	Pass
1	Base Foundation (Soil Interaction)	Base	56.5	Pass

Structure Rating (max from all components) =	84.5%

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

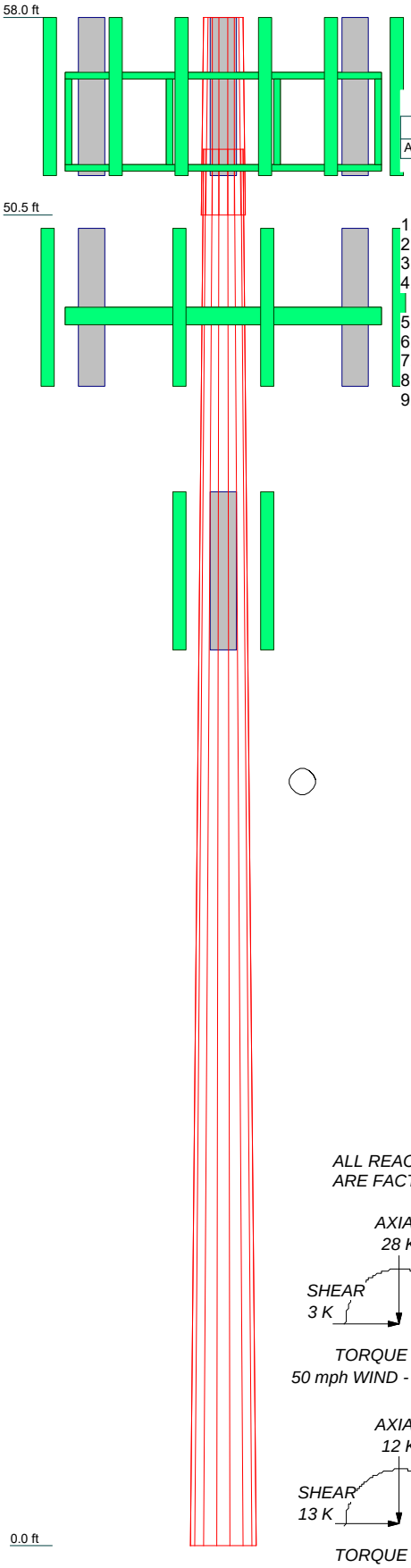
4.1) Recommendations

The tower and its foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	7.500	18	0.188	2.500	17.393	19.078		0.3
2	53.000	18	0.188		18.141	30.050	A572-65	2.6
								2.8



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 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: 84.5%

ALL REACTIONS ARE FACTORED

AXIAL 28 K

SHEAR 3 K *MOMENT 148 kip-ft*

TORQUE 0 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 12 K

SHEAR 13 K *MOMENT 595 kip-ft*

TORQUE 0 kip-ft
REACTIONS - 130 mph WIND

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

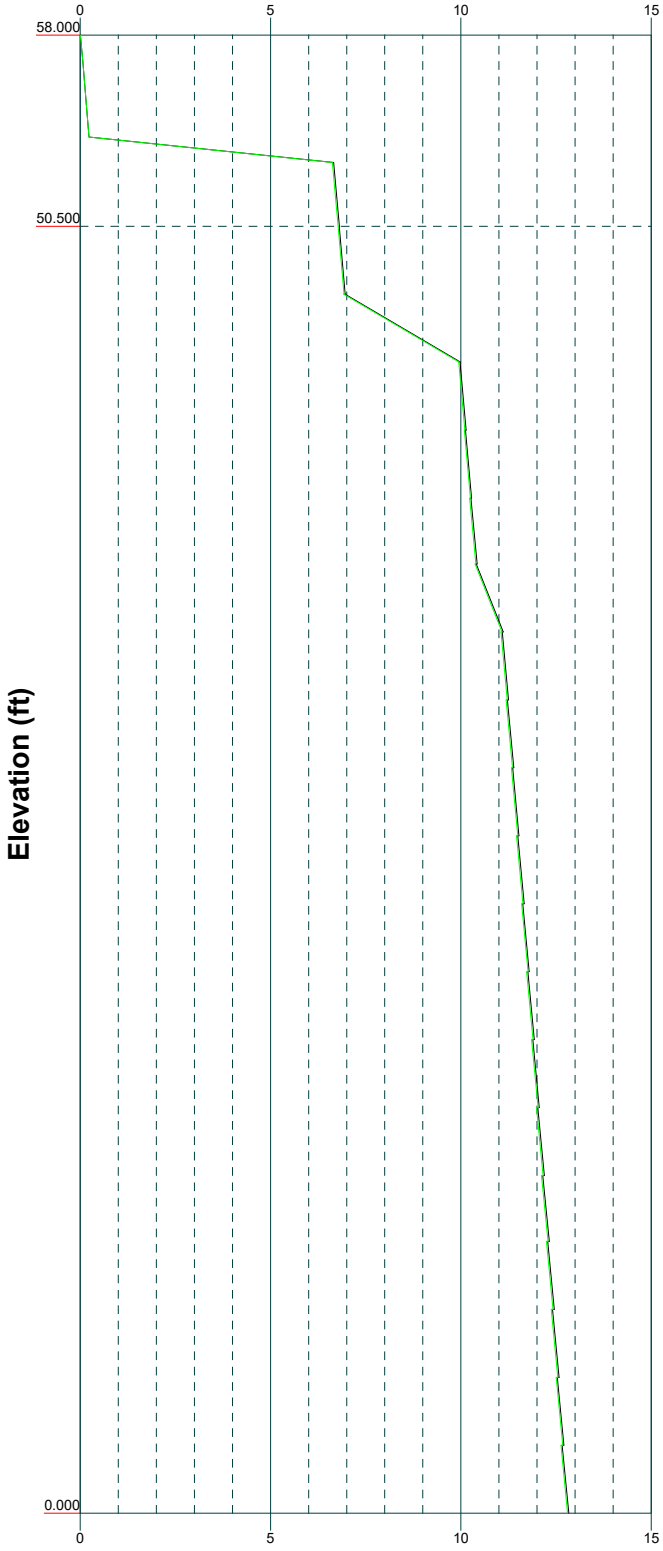
Job:	***98372.004.01 - EAST HAVEN SOUTH, CT (BU# 842862***		
Project:			
Client: Crown Castle	Drawn by: Sripada	App'd:	
Code: TIA-222-H	Date: 03/30/19	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 130 mph/50 mph 1.500 in Ice Exposure C

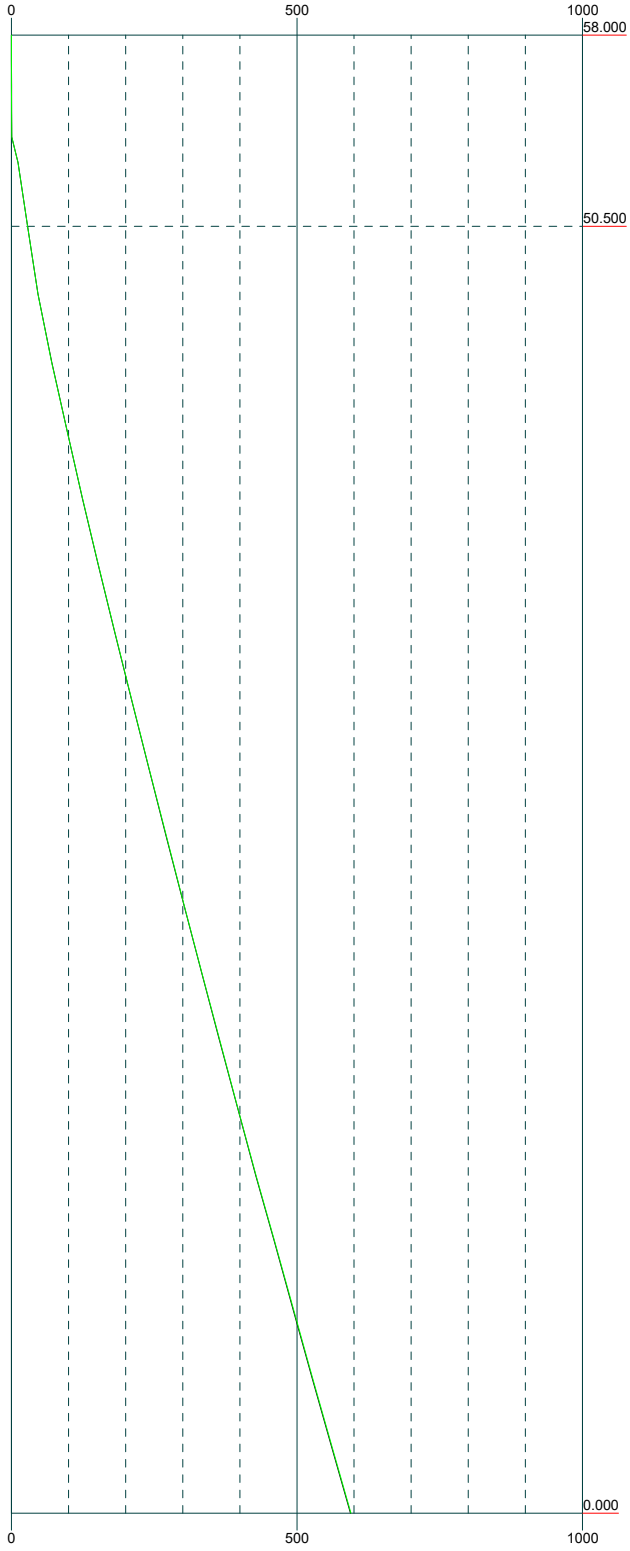
Maximum Values

Vx Vz Mx Mz

Global Mast Shear (K)



Global Mast Moment (kip-ft)

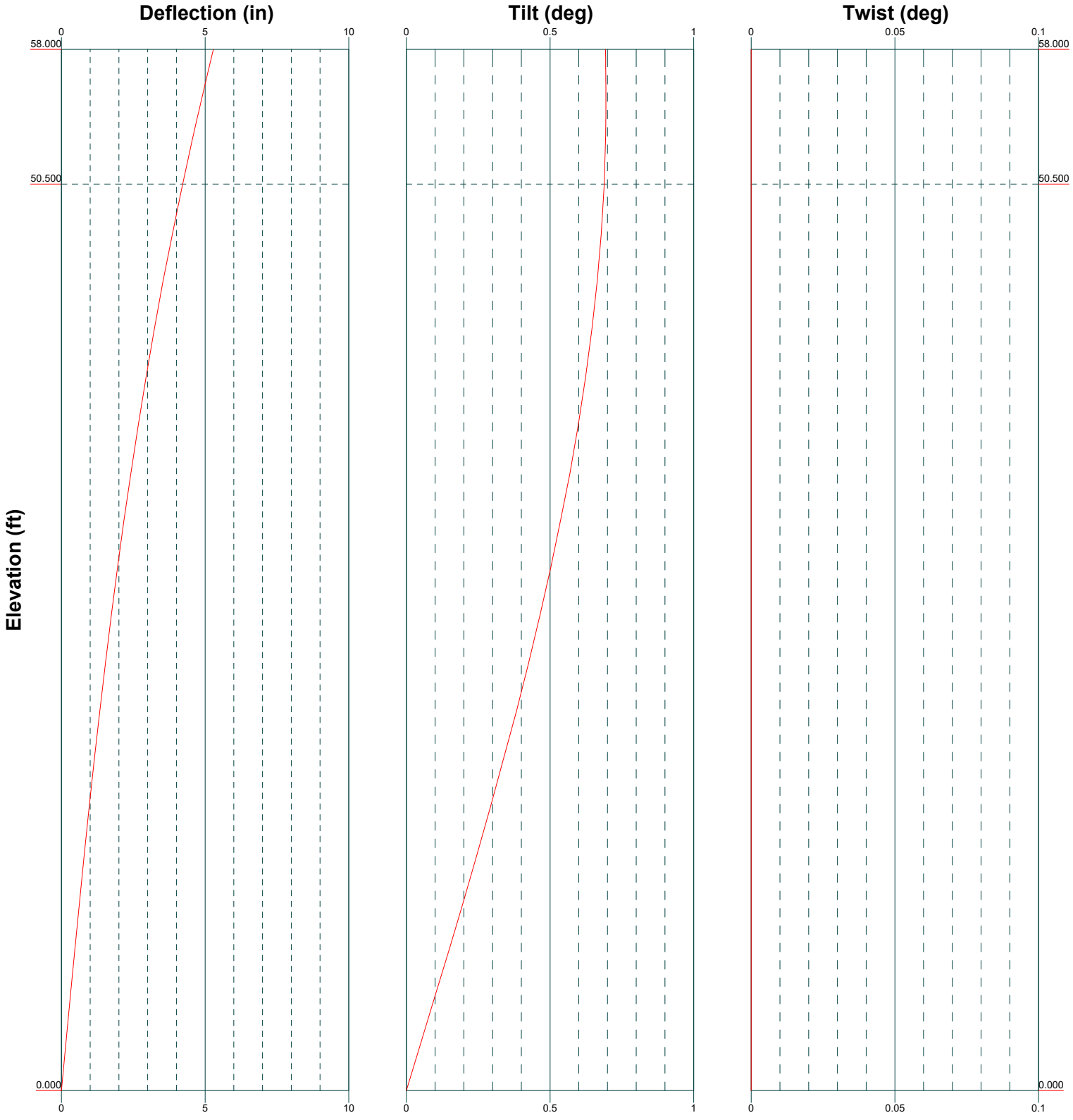


B+T Group
1717 S. Boulder, Suite 300
Tulsa OK, 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 98372.004.01 - EAST HAVEN SOUTH, CT (BU# 842862			
Project:			
Client: Crown Castle	Drawn by: Sripada	App'd:	
Code: TIA-222-H	Date: 03/30/19	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values

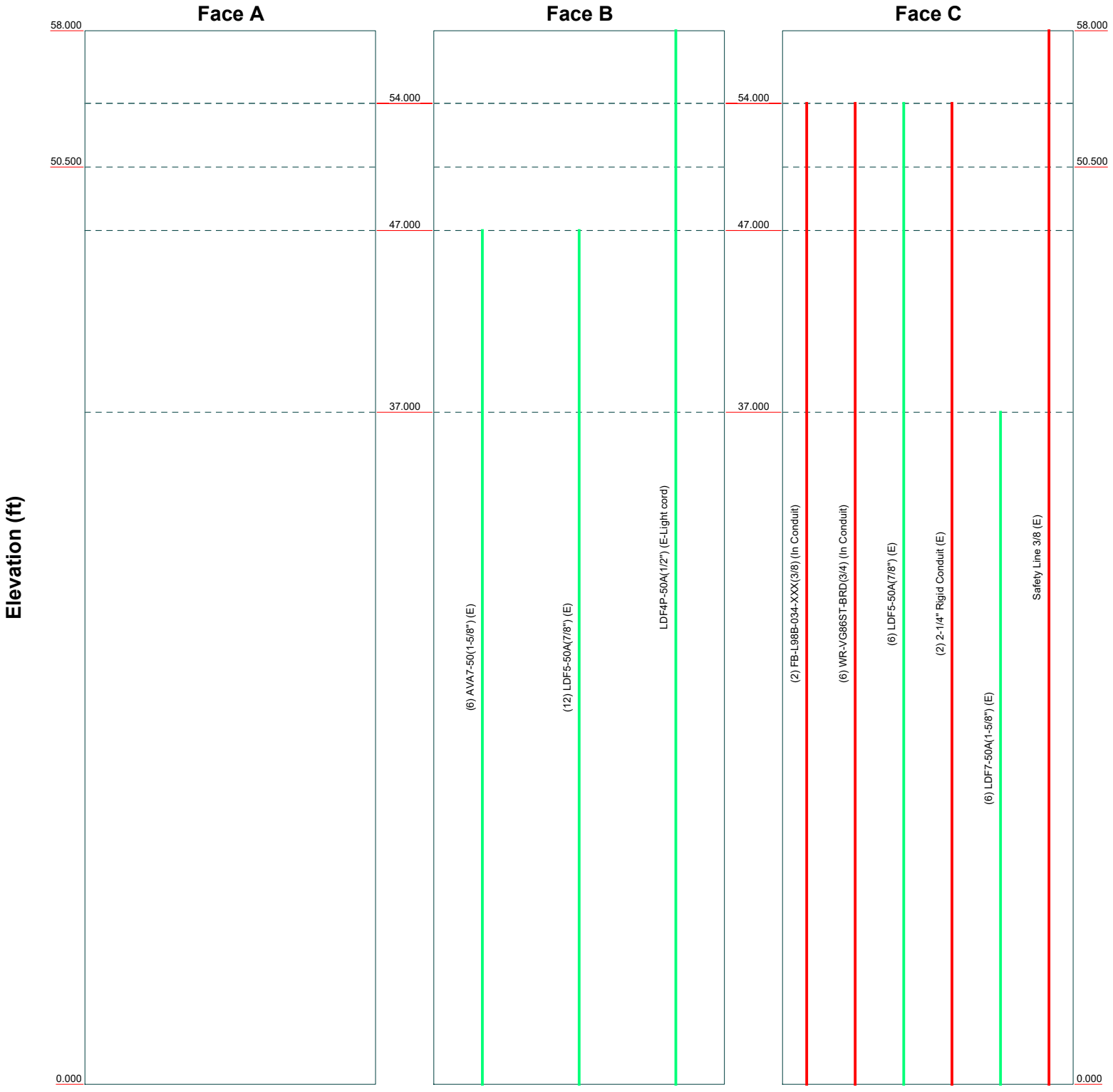


B+T Group
1717 S. Boulder, Suite 300
Tulsa OK, 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 98372.004.01 - EAST HAVEN SOUTH, CT (BU# 842862			
Project:			
Client: Crown Castle	Drawn by: Sripada	App'd:	
Code: TIA-222-H	Date: 03/30/19	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 58'

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



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

Job:	98372.004.01 - EAST HAVEN SOUTH, CT (BU# 842862		
Project:			
Client: Crown Castle		Drawn by: Sripada	App'd:
Code: TIA-222-H		Date: 03/30/19	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 New Haven County, Connecticut.
Tower base elevation above sea level: 35.000 ft.
Basic wind speed of 130 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 1.500 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	58.000-50.500	7.500	2.500	18	17.393	19.078	0.188	0.750	A572-65 (65 ksi)
L2	50.500-0.000	53.000		18	18.141	30.050	0.188	0.750	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	17.632	10.239	382.955	6.108	8.836	43.342	766.414	5.121	2.731	14.566
	19.343	11.242	506.846	6.706	9.692	52.297	1014.359	5.622	3.028	16.148
L2	18.963	10.685	435.128	6.374	9.216	47.215	870.829	5.343	2.863	15.269
	30.485	17.772	2002.277	10.601	15.265	131.164	4007.188	8.888	4.959	26.447

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 58.000-50.500				1	1	1			
L2 50.500-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
FB-L98B-034-XXX(3/8) (In Conduit)	C	No	Surface Ar (CaAa)	54.000 - 0.000	2	1	-0.300 -0.100	0.000		0.000
WR-VG86ST-BRD(3/4) (In Conduit)	C	No	Surface Ar (CaAa)	54.000 - 0.000	6	1	-0.300 -0.100	0.000		0.001
2-1/4" Rigid Conduit (E) *SRI*	C	No	Surface Ar (CaAa)	54.000 - 0.000	2	2	-0.300 -0.100	2.250		0.003
Safety Line 3/8 (E)	C	No	Surface Ar (CaAa)	58.000 - 0.000	1	1	0.000 0.010	0.375		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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF5-50A(7/8") (E)	C	No	No	Inside Pole	54.000 - 0.000	6	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
SRI AVA7-50(1-5/8") (E)	B	No	No	Inside Pole	47.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
LDF5-50A(7/8") (E)	B	No	No	Inside Pole	47.000 - 0.000	12	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
SRI LDF7-50A(1-5/8") (E)	C	No	No	Inside Pole	37.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
SRI LDF4P-50A(1/2") (E-Light cord)	B	No	No	Inside Pole	58.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" 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	58.000-50.500	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.001
		C	0.000	0.000	1.856	0.000	0.042
L2	50.500-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.391
		C	0.000	0.000	24.619	0.000	0.779

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	58.000-50.500	A	1.340	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.001
		C		0.000	0.000	7.308	0.000	0.155
L2	50.500-0.000	A	1.237	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.391
		C		0.000	0.000	87.813	0.000	2.243

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	58.000-50.500	0.649	1.718	0.800	2.658
L2	50.500-0.000	1.221	2.981	1.467	4.055

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	1	FB-L98B-034-XXX(3/8)	50.50 - 54.00	1.0000	1.0000
L1	2	WR-VG86ST-BRD(3/4)	50.50 - 54.00	1.0000	1.0000
L1	6	2-1/4" Rigid Conduit	50.50 - 54.00	1.0000	1.0000
L1	15	Safety Line 3/8	50.50 - 58.00	1.0000	1.0000

Discrete Tower Loads

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
(2) Side Lighting (E/TIA)	B	From Leg	0.000 0.000 1.000	0.000	58.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.108 0.170 0.233 0.389	0.108 0.170 0.233 0.389	0.005 0.007 0.010 0.019
SRI 800 10121 w/ Mount Pipe (EXISTING)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.388 5.813 6.234 7.102	4.600 5.351 6.046 7.475	0.066 0.114 0.168 0.298
800 10121 w/ Mount Pipe (EXISTING)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.388 5.813 6.234 7.102	4.600 5.351 6.046 7.475	0.066 0.114 0.168 0.298
800 10121 w/ Mount Pipe (EXISTING)	C	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.388 5.813 6.234 7.102	4.600 5.351 6.046 7.475	0.066 0.114 0.168 0.298
DC6-48-60-18-8F (EXISTING)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.917 1.458 1.643 2.042	0.917 1.458 1.643 2.042	0.019 0.037 0.057 0.105

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
QS66512-6 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.371 8.931 9.457 10.531	8.463 9.657 10.548 12.352	0.137 0.212 0.296 0.492
QS66512-6 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.371 8.931 9.457 10.531	8.463 9.657 10.548 12.352	0.137 0.212 0.296 0.492
QS66512-6 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.371 8.931 9.457 10.531	8.463 9.657 10.548 12.352	0.137 0.212 0.296 0.492
80010965 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.051 14.688 15.303 16.530	7.628 8.903 9.963 11.925	0.125 0.222 0.327 0.569
80010965 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.051 14.688 15.303 16.530	7.628 8.903 9.963 11.925	0.125 0.222 0.327 0.569
80010965 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.051 14.688 15.303 16.530	7.628 8.903 9.963 11.925	0.125 0.222 0.327 0.569
RRUS 8843 B2/B66A (P)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.799 1.966 2.323	1.353 1.500 1.655 1.986	0.072 0.090 0.110 0.159
RRUS 8843 B2/B66A (P)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.799 1.966 2.323	1.353 1.500 1.655 1.986	0.072 0.090 0.110 0.159
RRUS 8843 B2/B66A (P)	C	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.639 1.799 1.966 2.323	1.353 1.500 1.655 1.986	0.072 0.090 0.110 0.159
(2) LGP21401 (P)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401 (P)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401 (P)	C	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
RRUS 32 (P)	A	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.055 0.077 0.103 0.165
RRUS 32 (P)	B	From Leg	4.000 0.000 1.000	0.000	54.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.857 3.083 3.316 3.805	1.777 1.968 2.166 2.583	0.055 0.077 0.103 0.165
RRUS 32	C	From Leg	4.000	0.000	54.000	No Ice	2.857	1.777	0.055

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(P)			0.000				1/2" Ice	3.083	1.968	0.077
			1.000				1" Ice	3.316	2.166	0.103
							2" Ice	3.805	2.583	0.165
DC6-48-60-18-8F	A	From Leg	4.000		0.000	54.000	No Ice	0.917	0.917	0.019
(P)			0.000				1/2" Ice	1.458	1.458	0.037
			1.000				1" Ice	1.643	1.643	0.057
							2" Ice	2.042	2.042	0.105
DC6-48-60-18-8C	B	From Leg	4.000		0.000	54.000	No Ice	2.737	2.737	0.026
(P)			0.000				1/2" Ice	2.963	2.963	0.052
			1.000				1" Ice	3.196	3.196	0.082
							2" Ice	3.684	3.684	0.152
RRUS 4449 B5/B12	B	From Leg	4.000		0.000	54.000	No Ice	1.968	1.408	0.071
(P)			0.000				1/2" Ice	2.144	1.564	0.090
			1.000				1" Ice	2.328	1.727	0.111
							2" Ice	2.718	2.075	0.163
(2) RRUS 4449 B5/B12	C	From Leg	4.000		0.000	54.000	No Ice	1.968	1.408	0.071
(P)			0.000				1/2" Ice	2.144	1.564	0.090
			1.000				1" Ice	2.328	1.727	0.111
							2" Ice	2.718	2.075	0.163
12' horizontal x 2" Pipe Mount	A	From Leg	2.000		0.000	54.000	No Ice	1.000	1.000	0.100
			0.000				1/2" Ice	2.115	2.115	0.650
(STK-U)			0.000				1" Ice	2.839	2.839	1.215
							2" Ice	4.317	4.317	2.390
12' horizontal x 2" Pipe Mount	B	From Leg	2.000		0.000	54.000	No Ice	1.000	1.000	0.100
			0.000				1/2" Ice	2.115	2.115	0.650
(STK-U)			0.000				1" Ice	2.839	2.839	1.215
							2" Ice	4.317	4.317	2.390
12' horizontal x 2" Pipe Mount	C	From Leg	2.000		0.000	54.000	No Ice	1.000	1.000	0.100
			0.000				1/2" Ice	2.115	2.115	0.650
(STK-U)			0.000				1" Ice	2.839	2.839	1.215
							2" Ice	4.317	4.317	2.390
Pipe Mount [PM 602-3]	C	None			0.000	54.000	No Ice	7.680	7.680	0.279
(E-Mount Support)							1/2" Ice	9.500	9.500	0.353
							1" Ice	11.320	11.320	0.427
							2" Ice	14.960	14.960	0.576
Sector Mount [SM 502-3]	C	None			0.000	54.000	No Ice	33.020	33.020	1.673
(E-Sabre 12' V-Boom)							1/2" Ice	47.360	47.360	2.224
							1" Ice	61.700	61.700	2.775
							2" Ice	90.380	90.380	3.876
SRI										
APX16DWV-16DWVS-C w/ Mount Pipe	A	From Leg	4.000		0.000	47.000	No Ice	6.824	3.494	0.061
			0.000				1/2" Ice	7.275	4.263	0.110
(E)			0.000				1" Ice	7.719	4.960	0.165
							2" Ice	8.633	6.403	0.298
APX16DWV-16DWVS-C w/ Mount Pipe	B	From Leg	4.000		0.000	47.000	No Ice	6.824	3.494	0.061
			0.000				1/2" Ice	7.275	4.263	0.110
(E)			0.000				1" Ice	7.719	4.960	0.165
							2" Ice	8.633	6.403	0.298
APX16DWV-16DWVS-C w/ Mount Pipe	C	From Leg	4.000		0.000	47.000	No Ice	6.824	3.494	0.061
			0.000				1/2" Ice	7.275	4.263	0.110
(E)			0.000				1" Ice	7.719	4.960	0.165
							2" Ice	8.633	6.403	0.298
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.000		0.000	47.000	No Ice	11.683	9.842	0.083
			0.000				1/2" Ice	12.404	11.366	0.173
(E)			0.000				1" Ice	13.135	12.914	0.273
							2" Ice	14.512	15.267	0.506
LNX-6515DS-VTM w/	B	From Leg	4.000		0.000	47.000	No Ice	11.683	9.842	0.083

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.000				1/2" Ice	12.404	11.366	0.173
(E)			0.000				1" Ice	13.135	12.914	0.273
							2" Ice	14.512	15.267	0.506
LNX-6515DS-VTM w/	C	From Leg	4.000		0.000	47.000	No Ice	11.683	9.842	0.083
Mount Pipe			0.000				1/2" Ice	12.404	11.366	0.173
(E)			0.000				1" Ice	13.135	12.914	0.273
							2" Ice	14.512	15.267	0.506
(2) 1900 MHZ G	A	From Leg	4.000		0.000	47.000	No Ice	0.233	0.433	0.018
(E)			0.000				1/2" Ice	0.298	0.531	0.024
			0.000				1" Ice	0.370	0.637	0.032
							2" Ice	0.537	0.870	0.055
(2) 1900 MHZ G	B	From Leg	4.000		0.000	47.000	No Ice	0.233	0.433	0.018
(E)			0.000				1/2" Ice	0.298	0.531	0.024
			0.000				1" Ice	0.370	0.637	0.032
							2" Ice	0.537	0.870	0.055
(2) 1900 MHZ G	C	From Leg	4.000		0.000	47.000	No Ice	0.233	0.433	0.018
(E)			0.000				1/2" Ice	0.298	0.531	0.024
			0.000				1" Ice	0.370	0.637	0.032
							2" Ice	0.537	0.870	0.055
KRY 112 144/1	A	From Leg	4.000		0.000	47.000	No Ice	0.350	0.175	0.011
(E)			0.000				1/2" Ice	0.426	0.234	0.014
			0.000				1" Ice	0.509	0.301	0.019
							2" Ice	0.698	0.456	0.032
KRY 112 144/1	B	From Leg	4.000		0.000	47.000	No Ice	0.350	0.175	0.011
(E)			0.000				1/2" Ice	0.426	0.234	0.014
			0.000				1" Ice	0.509	0.301	0.019
							2" Ice	0.698	0.456	0.032
KRY 112 144/1	C	From Leg	4.000		0.000	47.000	No Ice	0.350	0.175	0.011
(E)			0.000				1/2" Ice	0.426	0.234	0.014
			0.000				1" Ice	0.509	0.301	0.019
							2" Ice	0.698	0.456	0.032
ATBT-BOTTOM-24V	A	From Leg	4.000		0.000	47.000	No Ice	0.104	0.065	0.003
(E)			0.000				1/2" Ice	0.148	0.102	0.004
			0.000				1" Ice	0.199	0.147	0.006
							2" Ice	0.323	0.259	0.013
ATBT-BOTTOM-24V	B	From Leg	4.000		0.000	47.000	No Ice	0.104	0.065	0.003
(E)			0.000				1/2" Ice	0.148	0.102	0.004
			0.000				1" Ice	0.199	0.147	0.006
							2" Ice	0.323	0.259	0.013
ATBT-BOTTOM-24V	C	From Leg	4.000		0.000	47.000	No Ice	0.104	0.065	0.003
(E)			0.000				1/2" Ice	0.148	0.102	0.004
			0.000				1" Ice	0.199	0.147	0.006
							2" Ice	0.323	0.259	0.013
7'x2" Antenna Mount Pipe	A	From Leg	4.000		0.000	47.000	No Ice	1.663	1.663	0.026
(E)			0.000				1/2" Ice	2.391	2.391	0.039
			0.000				1" Ice	2.825	2.825	0.056
							2" Ice	3.706	3.706	0.105
7'x2" Antenna Mount Pipe	B	From Leg	4.000		0.000	47.000	No Ice	1.663	1.663	0.026
(E)			0.000				1/2" Ice	2.391	2.391	0.039
			0.000				1" Ice	2.825	2.825	0.056
							2" Ice	3.706	3.706	0.105
7'x2" Antenna Mount Pipe	C	From Leg	4.000		0.000	47.000	No Ice	1.663	1.663	0.026
(E)			0.000				1/2" Ice	2.391	2.391	0.039
			0.000				1" Ice	2.825	2.825	0.056
							2" Ice	3.706	3.706	0.105
Platform Mount [LP 303-1]	C	None			0.000	47.000	No Ice	14.660	14.660	1.250
(E)							1/2" Ice	18.870	18.870	1.481

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
						1" Ice	23.080	23.080	1.713
						2" Ice	31.500	31.500	2.175
SRI									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.000 0.000	0.000	37.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.052 0.097
(E-Direct to mount pole)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.000 0.000	0.000	37.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.052 0.097
(E-Direct to mount pole)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.000 0.000	0.000	37.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.052 0.097
(E-Direct to mount pole)			0.000			1" Ice	6.481	6.734	0.150
						2" Ice	7.547	8.515	0.280
SRI									

Load Combinations

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	58 - 50.5	Pole	Max Tension	33	0.000	0.000	0.002
			Max. Compression	26	-14.356	0.114	-0.650
			Max. Mx	20	-2.467	14.546	-0.276
			Max. My	14	-2.468	0.139	-14.621
			Max. Vy	20	-6.657	11.374	-0.496
			Max. Vx	14	6.624	0.246	-11.588
			Max. Torque	6			-0.389
L2	50.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.672	0.128	-3.094
			Max. Mx	20	-12.104	594.488	-1.713
			Max. My	14	-12.104	0.752	-593.631
			Max. Vy	20	-12.835	594.488	-1.713
			Max. Vx	14	12.802	0.752	-593.631
			Max. Torque	6			-0.389

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	27.672	0.002	-3.034
	Max. H_x	20	12.129	12.811	-0.009
	Max. H_z	2	12.129	-0.009	12.778
	Max. M_x	2	591.259	-0.009	12.778
	Max. M_z	8	594.037	-12.811	0.009
	Max. Torsion	18	0.387	11.099	-6.397
	Min. Vert	25	9.097	6.397	11.062
	Min. H_x	8	12.129	-12.811	0.009
	Min. H_z	14	12.129	0.009	-12.778

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M_x	14	-593.631	0.009	-12.778
	Min. M_z	20	-594.488	12.811	-0.009
	Min. Torsion	6	-0.388	-11.099	6.397

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	10.108	0.000	0.000	0.973	0.184	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	12.129	0.009	-12.778	-591.259	-0.299	0.203
0.9 Dead+1.0 Wind 0 deg - No Ice	9.097	0.009	-12.778	-587.381	-0.353	0.206
1.2 Dead+1.0 Wind 30 deg - No Ice	12.129	6.413	-11.071	-512.149	-297.362	0.341
0.9 Dead+1.0 Wind 30 deg - No Ice	9.097	6.413	-11.071	-508.829	-295.318	0.341
1.2 Dead+1.0 Wind 60 deg - No Ice	12.129	11.099	-6.397	-295.490	-514.685	0.388
0.9 Dead+1.0 Wind 60 deg - No Ice	9.097	11.099	-6.397	-293.700	-511.106	0.383
1.2 Dead+1.0 Wind 90 deg - No Ice	12.129	12.811	-0.009	0.662	-594.037	0.330
0.9 Dead+1.0 Wind 90 deg - No Ice	9.097	12.811	-0.009	0.361	-589.899	0.323
1.2 Dead+1.0 Wind 120 deg - No Ice	12.129	11.090	6.381	296.955	-514.159	0.184
0.9 Dead+1.0 Wind 120 deg - No Ice	9.097	11.090	6.381	294.561	-510.585	0.176
1.2 Dead+1.0 Wind 150 deg - No Ice	12.129	6.397	11.062	513.998	-296.451	-0.011
0.9 Dead+1.0 Wind 150 deg - No Ice	9.097	6.397	11.062	510.071	-294.415	-0.017
1.2 Dead+1.0 Wind 180 deg - No Ice	12.129	-0.009	12.778	593.631	0.752	-0.202
0.9 Dead+1.0 Wind 180 deg - No Ice	9.097	-0.009	12.778	589.143	0.689	-0.206
1.2 Dead+1.0 Wind 210 deg - No Ice	12.129	-6.413	11.071	514.520	297.813	-0.340
0.9 Dead+1.0 Wind 210 deg - No Ice	9.097	-6.413	11.071	510.591	295.653	-0.339
1.2 Dead+1.0 Wind 240 deg - No Ice	12.129	-11.099	6.397	297.863	515.135	-0.387
0.9 Dead+1.0 Wind 240 deg - No Ice	9.097	-11.099	6.397	295.463	511.439	-0.382
1.2 Dead+1.0 Wind 270 deg - No Ice	12.129	-12.811	0.009	1.713	594.488	-0.330
0.9 Dead+1.0 Wind 270 deg - No Ice	9.097	-12.811	0.009	1.403	590.233	-0.323
1.2 Dead+1.0 Wind 300 deg - No Ice	12.129	-11.090	-6.381	-294.580	514.612	-0.185
0.9 Dead+1.0 Wind 300 deg - No Ice	9.097	-11.090	-6.381	-292.797	510.920	-0.177
1.2 Dead+1.0 Wind 330 deg - No Ice	12.129	-6.397	-11.062	-511.624	296.905	0.010
0.9 Dead+1.0 Wind 330 deg -	9.097	-6.397	-11.062	-508.308	294.751	0.017

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
No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	27.672	-0.000	0.000	3.094	0.128	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	27.672	0.002	-3.034	-141.367	0.039	0.036
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	27.672	1.521	-2.628	-122.055	-72.344	0.048
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	27.672	2.632	-1.518	-69.205	-125.308	0.047
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	27.672	3.039	-0.002	3.023	-144.661	0.034
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	27.672	2.631	1.515	75.278	-125.223	0.011
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	27.672	1.518	2.626	128.196	-72.191	-0.015
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	27.672	-0.002	3.034	147.591	0.219	-0.036
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	27.672	-1.521	2.628	128.285	72.605	-0.048
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	27.672	-2.632	1.518	75.433	125.571	-0.047
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	27.672	-3.039	0.002	3.202	144.918	-0.033
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	27.672	-2.631	-1.515	-69.049	125.476	-0.011
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	27.672	-1.518	-2.626	-121.965	72.446	0.015
Dead+Wind 0 deg - Service	10.108	0.002	-2.564	-117.396	0.082	0.041
Dead+Wind 30 deg - Service	10.108	1.287	-2.221	-101.589	-59.276	0.069
Dead+Wind 60 deg - Service	10.108	2.227	-1.283	-58.297	-102.702	0.077
Dead+Wind 90 deg - Service	10.108	2.570	-0.002	0.880	-118.558	0.066
Dead+Wind 120 deg - Service	10.108	2.225	1.280	60.084	-102.597	0.036
Dead+Wind 150 deg - Service	10.108	1.283	2.219	103.453	-59.095	-0.003
Dead+Wind 180 deg - Service	10.108	-0.002	2.564	119.366	0.292	-0.041
Dead+Wind 210 deg - Service	10.108	-1.287	2.221	103.558	59.650	-0.069
Dead+Wind 240 deg - Service	10.108	-2.227	1.283	60.266	103.075	-0.077
Dead+Wind 270 deg - Service	10.108	-2.570	0.002	1.090	118.931	-0.066
Dead+Wind 300 deg - Service	10.108	-2.225	-1.280	-58.115	102.970	-0.036
Dead+Wind 330 deg - Service	10.108	-1.283	-2.219	-101.484	59.468	0.003

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-10.108	0.000	0.000	10.108	0.000	0.000%
2	0.009	-12.129	-12.778	-0.009	12.129	12.778	0.000%
3	0.009	-9.097	-12.778	-0.009	9.097	12.778	0.000%
4	6.413	-12.129	-11.071	-6.413	12.129	11.071	0.000%
5	6.413	-9.097	-11.071	-6.413	9.097	11.071	0.000%
6	11.099	-12.129	-6.397	-11.099	12.129	6.397	0.000%
7	11.099	-9.097	-6.397	-11.099	9.097	6.397	0.000%
8	12.811	-12.129	-0.009	-12.811	12.129	0.009	0.000%
9	12.811	-9.097	-0.009	-12.811	9.097	0.009	0.000%
10	11.090	-12.129	6.381	-11.090	12.129	-6.381	0.000%
11	11.090	-9.097	6.381	-11.090	9.097	-6.381	0.000%
12	6.397	-12.129	11.062	-6.397	12.129	-11.062	0.000%
13	6.397	-9.097	11.062	-6.397	9.097	-11.062	0.000%
14	-0.009	-12.129	12.778	0.009	12.129	-12.778	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
15	-0.009	-9.097	12.778	0.009	9.097	-12.778	0.000%
16	-6.413	-12.129	11.071	6.413	12.129	-11.071	0.000%
17	-6.413	-9.097	11.071	6.413	9.097	-11.071	0.000%
18	-11.099	-12.129	6.397	11.099	12.129	-6.397	0.000%
19	-11.099	-9.097	6.397	11.099	9.097	-6.397	0.000%
20	-12.811	-12.129	0.009	12.811	12.129	-0.009	0.000%
21	-12.811	-9.097	0.009	12.811	9.097	-0.009	0.000%
22	-11.090	-12.129	-6.381	11.090	12.129	6.381	0.000%
23	-11.090	-9.097	-6.381	11.090	9.097	6.381	0.000%
24	-6.397	-12.129	-11.062	6.397	12.129	11.062	0.000%
25	-6.397	-9.097	-11.062	6.397	9.097	11.062	0.000%
26	0.000	-27.672	0.000	0.000	27.672	-0.000	0.000%
27	0.002	-27.672	-3.033	-0.002	27.672	3.034	0.000%
28	1.521	-27.672	-2.628	-1.521	27.672	2.628	0.000%
29	2.632	-27.672	-1.518	-2.632	27.672	1.518	0.000%
30	3.039	-27.672	-0.002	-3.039	27.672	0.002	0.000%
31	2.631	-27.672	1.515	-2.631	27.672	-1.515	0.000%
32	1.518	-27.672	2.626	-1.518	27.672	-2.626	0.000%
33	-0.002	-27.672	3.033	0.002	27.672	-3.034	0.000%
34	-1.521	-27.672	2.628	1.521	27.672	-2.628	0.000%
35	-2.632	-27.672	1.518	2.632	27.672	-1.518	0.000%
36	-3.039	-27.672	0.002	3.039	27.672	-0.002	0.000%
37	-2.631	-27.672	-1.515	2.631	27.672	1.515	0.000%
38	-1.518	-27.672	-2.626	1.518	27.672	2.626	0.000%
39	0.002	-10.108	-2.564	-0.002	10.108	2.564	0.000%
40	1.287	-10.108	-2.221	-1.287	10.108	2.221	0.000%
41	2.227	-10.108	-1.283	-2.227	10.108	1.283	0.000%
42	2.570	-10.108	-0.002	-2.570	10.108	0.002	0.000%
43	2.225	-10.108	1.280	-2.225	10.108	-1.280	0.000%
44	1.283	-10.108	2.219	-1.283	10.108	-2.219	0.000%
45	-0.002	-10.108	2.564	0.002	10.108	-2.564	0.000%
46	-1.287	-10.108	2.221	1.287	10.108	-2.221	0.000%
47	-2.227	-10.108	1.283	2.227	10.108	-1.283	0.000%
48	-2.570	-10.108	0.002	2.570	10.108	-0.002	0.000%
49	-2.225	-10.108	-1.280	2.225	10.108	1.280	0.000%
50	-1.283	-10.108	-2.219	1.283	10.108	2.219	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00019723
3	Yes	4	0.00000001	0.00012363
4	Yes	5	0.00000001	0.00013012
5	Yes	5	0.00000001	0.00005679
6	Yes	5	0.00000001	0.00011789
7	Yes	5	0.00000001	0.00005112
8	Yes	4	0.00000001	0.00032737
9	Yes	4	0.00000001	0.00019378
10	Yes	5	0.00000001	0.00012833
11	Yes	5	0.00000001	0.00005567
12	Yes	5	0.00000001	0.00012523
13	Yes	5	0.00000001	0.00005436
14	Yes	4	0.00000001	0.00018046
15	Yes	4	0.00000001	0.00011323

16	Yes	5	0.00000001	0.00012063
17	Yes	5	0.00000001	0.00005206
18	Yes	5	0.00000001	0.00013325
19	Yes	5	0.00000001	0.00005788
20	Yes	4	0.00000001	0.00034584
21	Yes	4	0.00000001	0.00020491
22	Yes	5	0.00000001	0.00012088
23	Yes	5	0.00000001	0.00005251
24	Yes	5	0.00000001	0.00012364
25	Yes	5	0.00000001	0.00005369
26	Yes	4	0.00000001	0.00002134
27	Yes	4	0.00000001	0.00079236
28	Yes	4	0.00000001	0.00098624
29	Yes	4	0.00000001	0.00097732
30	Yes	4	0.00000001	0.00081629
31	Yes	5	0.00000001	0.00009410
32	Yes	5	0.00000001	0.00009391
33	Yes	4	0.00000001	0.00083608
34	Yes	5	0.00000001	0.00009392
35	Yes	5	0.00000001	0.00009502
36	Yes	4	0.00000001	0.00081918
37	Yes	4	0.00000001	0.00098189
38	Yes	4	0.00000001	0.00098199
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00005089
41	Yes	4	0.00000001	0.00003516
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00004787
44	Yes	4	0.00000001	0.00004332
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00003854
47	Yes	4	0.00000001	0.00005579
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00003738
50	Yes	4	0.00000001	0.00004085

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	58 - 50.5	5.287	46	0.695	0.002
L2	53 - 0	4.559	46	0.694	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
58.000	(2) Side Lighting	46	5.287	0.695	0.002	4770
54.000	800 10121 w/ Mount Pipe	46	4.701	0.695	0.002	4770
47.000	APX16DWV-16DWVS-C w/ Mount Pipe	46	3.770	0.674	0.001	4398
37.000	APXV18-206517S-C w/ Mount Pipe	46	2.667	0.595	0.001	5586

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	58 - 50.5	26.256	18	3.446	0.008
L2	53 - 0	22.653	18	3.440	0.008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
58.000	(2) Side Lighting	18	26.256	3.446	0.008	972
54.000	800 10121 w/ Mount Pipe	18	23.355	3.445	0.008	972
47.000	APX16DWV-16DWVS-C w/ Mount Pipe	18	18.743	3.343	0.007	895
37.000	APXV18-206517S-C w/ Mount Pipe	18	13.272	2.954	0.006	1136

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	58 - 50.5 (1)	TP19.078x17.393x0.188	7.500	0.000	0.0	11.242	-2.467	657.669	0.004
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	53.000	0.000	0.0	17.772	-12.104	1039.660	0.012

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	58 - 50.5 (1)	TP19.078x17.393x0.188	14.679	319.168	0.046	0.000	319.168	0.000
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	595.052	681.328	0.873	0.000	681.328	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	58 - 50.5 (1)	TP19.078x17.393x0.188	3.532	197.301	0.018	0.176	326.402	0.001
L2	50.5 - 0 (2)	TP30.05x18.141x0.188	12.835	311.897	0.041	0.387	815.676	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	58 - 50.5 (1)	0.004	0.046	0.000	0.018	0.001	0.050 ✔	1.050	4.8.2 ✔
L2	50.5 - 0 (2)	0.012	0.873	0.000	0.041	0.000	0.887 ✔	1.050	4.8.2 ✔

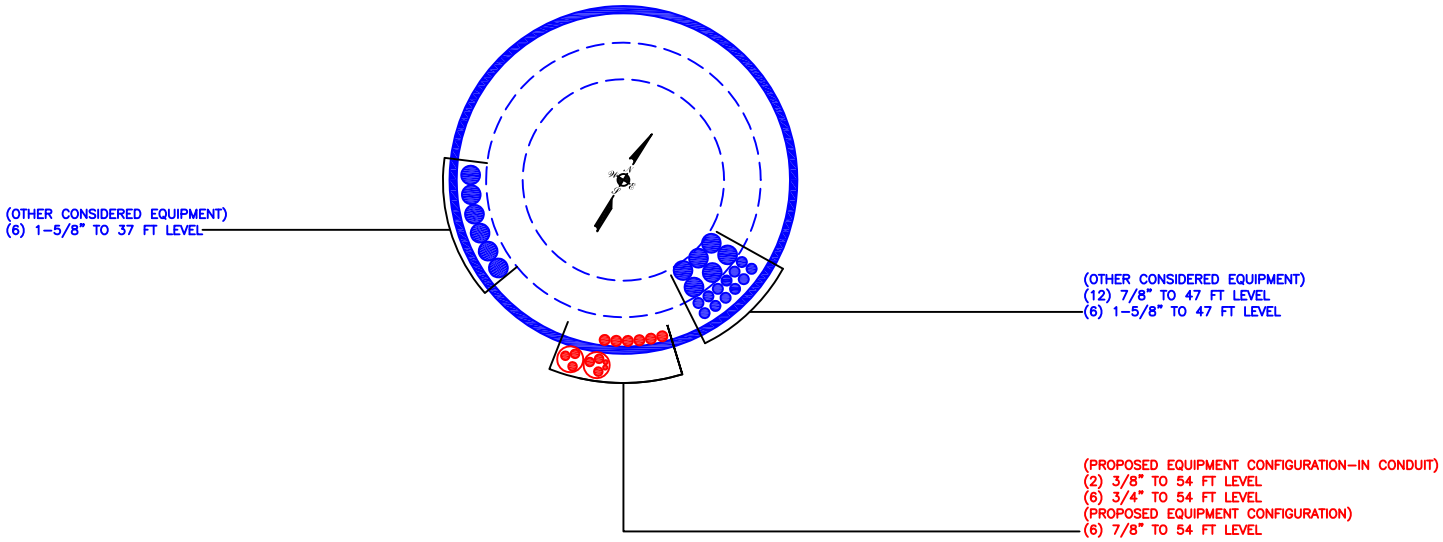
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	58 - 50.5	Pole	TP19.078x17.393x0.188	1	-2.467	690.552	4.8	Pass
L2	50.5 - 0	Pole	TP30.05x18.141x0.188	2	-12.104	1091.643	84.5	Pass
							Summary	
						Pole (L2)	84.5	Pass
						RATING =	**84.5**	**Pass**

Program Version 8.0.5.0

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT:842862

APPENDIX C

ADDITIONAL CALCULATIONS

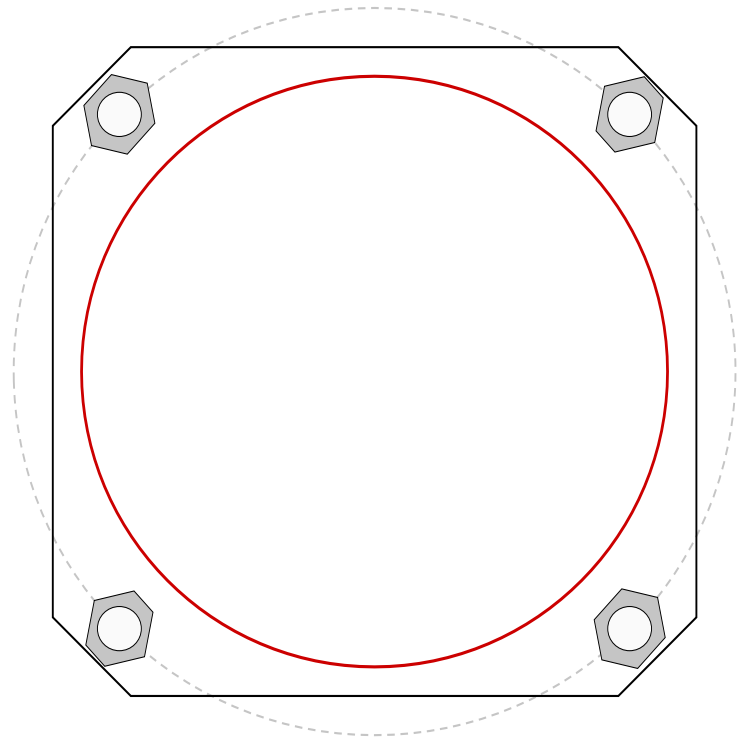
Monopole Base Plate Connection

Site Info	
BU #	842862
Site Name	EAST HAVEN SOUTH, CT
Order #	471828, Rev.2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	595.05
Axial Force (kips)	12.10
Shear Force (kips)	12.83

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(4) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 37" BC

Base Plate Data

33" OD x 2" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

30.05" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 195.72	ϕPn_c = 243.75	**Stress Rating**
Vu = 3.21	ϕVn = 73.13	**76.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	40.93	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**72.2%**	**Pass**

Pier and Pad Foundation

BU # :	842862
Site Name:	EAST HAVEN SOU
App. Number:	471828, Rev.2

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	12	kips
Base Shear, Vu_comp:	13	kips
Moment, M_u:	595	ft-kips
Tower Height, **H**:	58	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	15	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	14	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.5	ft
Pad Width, **W**:	14	ft
Pad Thickness, **T**:	2.5	ft
Pad Rebar Size (Bottom), **Sp**:	8	
Pad Rebar Quantity (Bottom), **mp**:	13	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	120	pcf
Ultimate Net Bearing, Qnet:	10.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	32	degrees
SPT Blow Count, N_{blows}:	21	
Base Friction, μ:	0.4	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	8	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	105.83	13.00	**11.7%**	**Pass**
Bearing Pressure (ksf)	8.09	2.19	**27.1%**	**Pass**
*Overturning (kip*ft)*	1219.71	688.98	**56.5%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	1676.07	653.50	**37.1%**	**Pass**
Pier Compression (kip)	11934.00	32.25	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	1145.25	215.71	**17.9%**	**Pass**
Pad Shear - 1-way (kips)	351.97	54.04	**14.6%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.016	**9.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	1971.95	392.10	**18.9%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**56.5%**
Structural Rating*:	**37.1%**

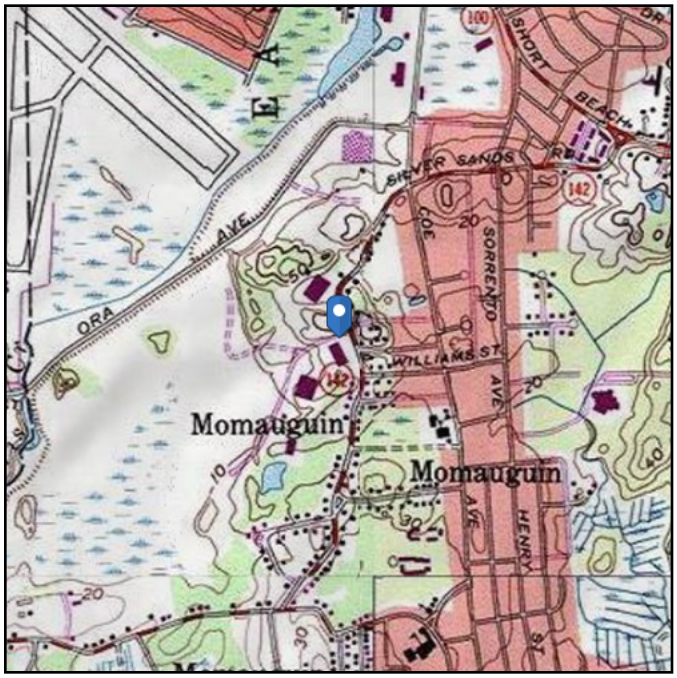
Version 3.2.0

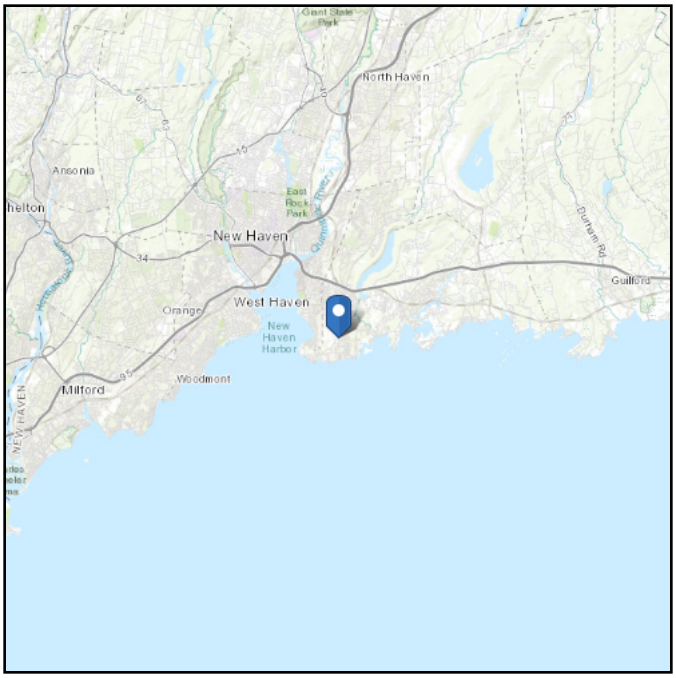
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 35.45 ft (NAVD 88)
Latitude: 41.256356
Longitude: -72.875778





Wind

Results:

Wind Speed:	127 Vmph
10-year MRI	78 Vmph
25-year MRI	87 Vmph
50-year MRI	95 Vmph
100-year MRI	103 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:	Tue Mar 26 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.

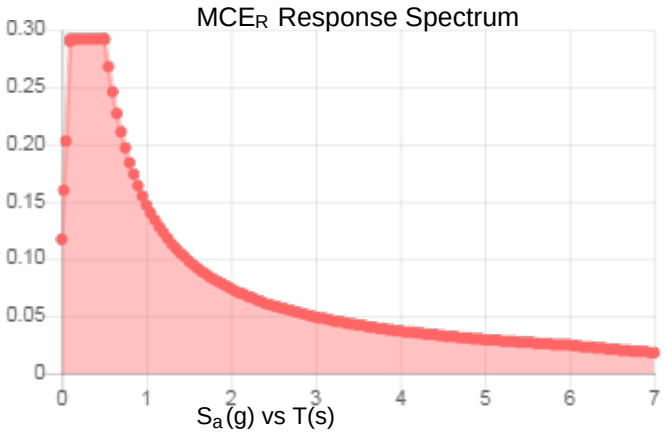
Seismic

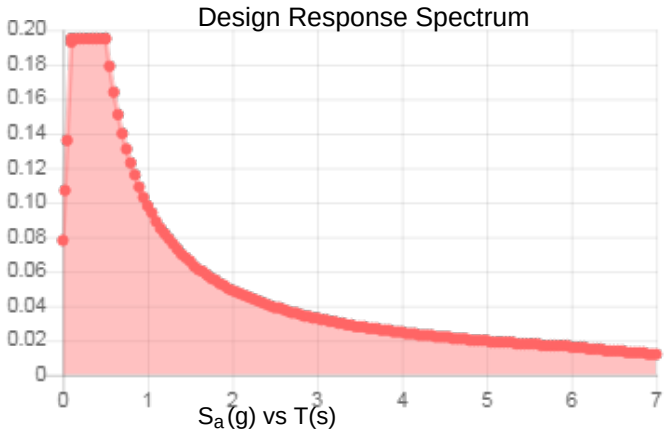
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.182	S_{DS} :	0.195
S_1 :	0.061	S_{D1} :	0.098
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.095
S_{MS} :	0.292	PGA_M :	0.152
S_{M1} :	0.147	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Mar 26 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:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Tue Mar 26 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.

Date: **January 24, 2019**

Charles McGuirt
Crown Castle
2055 S. Stearman Drive
Chandler, AZ 85286
(602)845-1791

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Subject:	**Mount Modification Analysis Report**	
Carrier Designation:	***AT&T Equipment Change-Out***	
	Carrier Site Number:	10071016
	Carrier Site Name:	CTL05048
Crown Castle Designation:	**Crown Castle BU Number:**	842862
	Crown Castle Site Name:	East Haven South
	Crown Castle JDE Job Number:	548695
	Crown Castle Order Number:	471828 Rev. 0
Engineering Firm Designation:	**Infinigy Report Designation:**	1039-A0002-B
Site Data:	**259 Commerce Rd, East Haven, New Haven County, CT 06512** **Latitude 41°15'22.88" Longitude -72°52'32.80"**	
Structure Information:	**Tower Height & Type:**	**59.0 ft Monopole**
	Mount Elevation:	**54.0 ft**
	Mount Type:	**12.0 ft Sector Mount**

Dear Charles McGuirt,

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

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

Sector Mount **Sufficient**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 127 mph from the 2015 International Building Code. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

We at Infinigy Engineering, PLLC appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Temitope Olaniyan

Respectfully Submitted by:

Joe Johnston, P.E.
VP Structural Engineering / Principal
Connecticut P.E. License Number: PEN.0029460

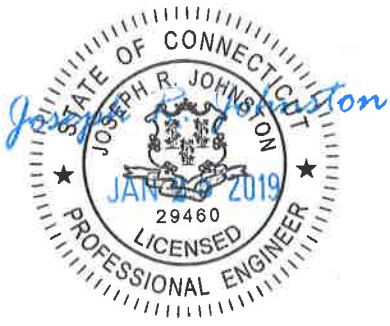


TABLE OF CONTENTS

1) INTRODUCTION

The mount is an existing 12.0 ft Sector Mount mapped by Infinigy Engineering. This mount is installed at the 54.0 ft elevation on 1 sector of the 59.0 ft Monopole**.**

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	127 mph
Exposure Category:	C
Topographic Factor at Base:	1.000
Topographic Factor at Mount:	1.000
Ice Thickness:	1.28 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.199
Seismic S_1:	0.053
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- Final Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
54.0	55.0	3	Kathrein	80010965	12.0' Sector Mount
		3	Kathrein	80010121	
		3	Quintel	QS66512-6	
		6	Powerwave	LGP 21401	
		1	Raycap	DC6-48-60-18-8C	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	8843 B2/B66A	
		3	Ericsson	RRUS 32	
		2	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	ATT Application	471828 Rev. 0	CCI Sites
Mount Data	Infinigy Engineering	Commscope SFG series	On File

3.1) Analysis Method

RISA-3D (Version 17.0.2), 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.

Infinigy Mount Analysis Tool 3.0.2, a tool internally developed by Infinigy, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

3.2) Assumptions

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

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (12.0 ft Sector Mount, All Sector)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe	MP4	54.0	60.3	Pass
	Horizontal	M3		82.4	Pass
	Tieback	M19B		15.3	Pass
	Stand Off	M1		67.1	Pass
2, 3	Mount to Tower Connection	-		3.9%	Pass

Structure Rating (max from all components) =	82.4%

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical
3) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N60A	Existing	1917	Pipe	2.0	2500.0	1
N65	Proposed	678.8	Pipe	2.0	2500.0	1

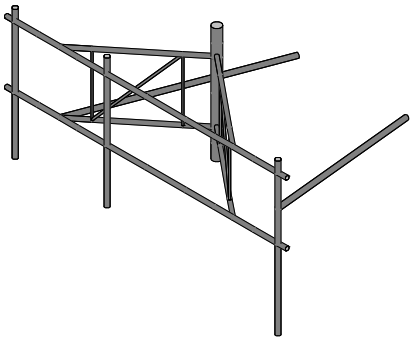
Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

The mount has sufficient capacity to support the proposed loading configuration when the following is installed.
(1) Sitepro1 Part # STK-U Stiff Arm Kit.

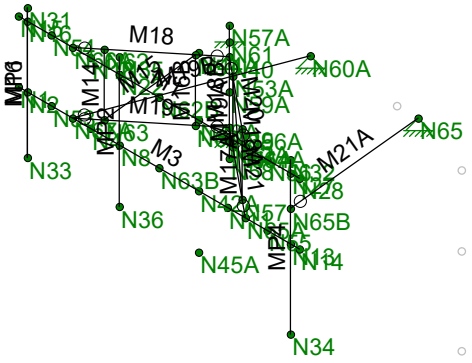
APPENDIX A

WIRE FRAME AND RENDERED MODELS



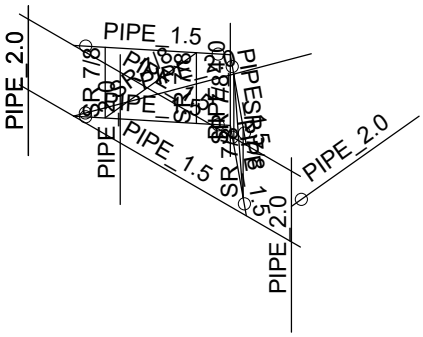
Envelope Only Solution

Infinigy Engineering	842862	Final Configuration 3
CLK		Jan 22, 2019 at 1:26 PM
1039-A0002-B		842862 mod.r3d



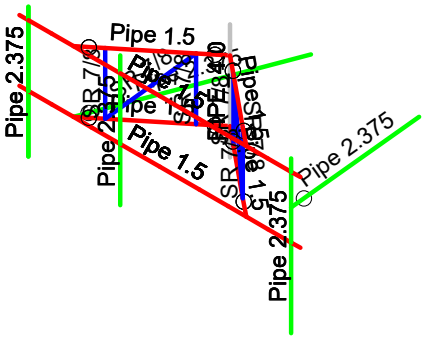
Envelope Only Solution

Infinigy Engineering	842862	Wireframe 4
CLK		Jan 22, 2019 at 1:26 PM
1039-A0002-B		842862 mod.r3d



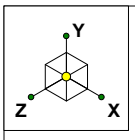
Envelope Only Solution

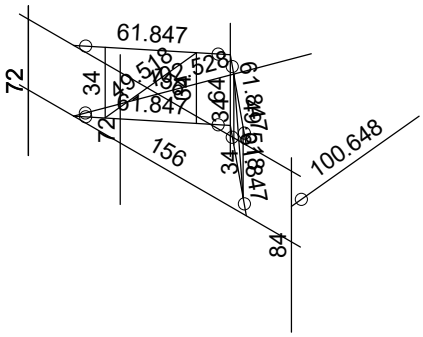
Infinigy Engineering	842862	Member Shapes 5
CLK		Jan 22, 2019 at 1:27 PM
1039-A0002-B		842862 mod.r3d



Envelope Only Solution

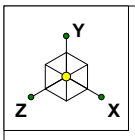
Infinigy Engineering	842862	Section Sets 7
CLK		Jan 22, 2019 at 1:27 PM
1039-A0002-B		842862 mod.r3d

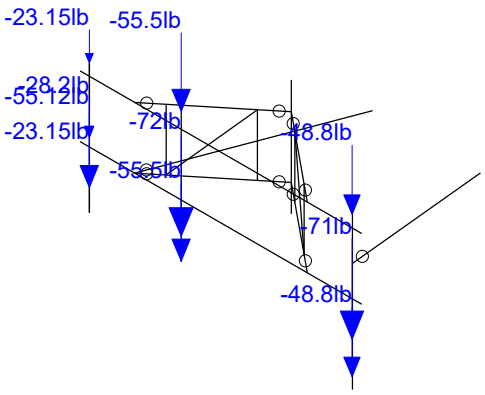




Member Length (in) Displayed
Envelope Only Solution

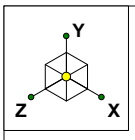
Infinigy Engineering	842862	Member Lengths 6
CLK		Jan 22, 2019 at 1:27 PM
1039-A0002-B		842862 mod.r3d

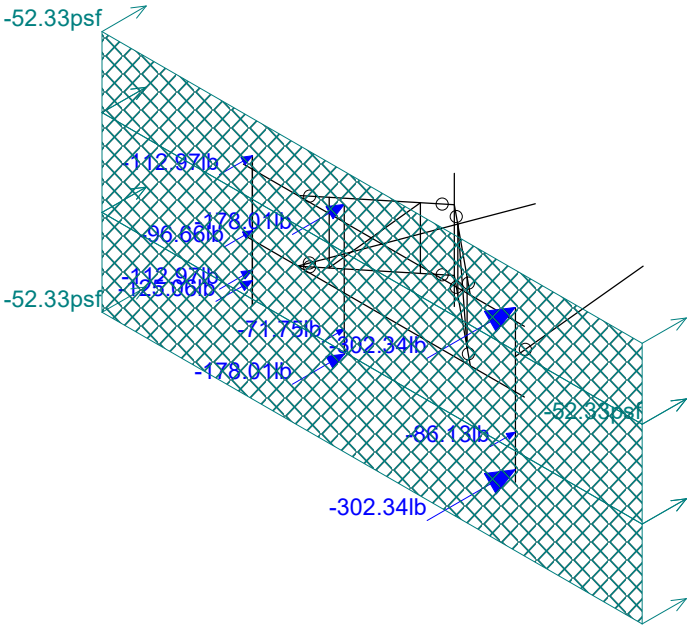




Loads: BLC 1, Self Weight
Envelope Only Solution

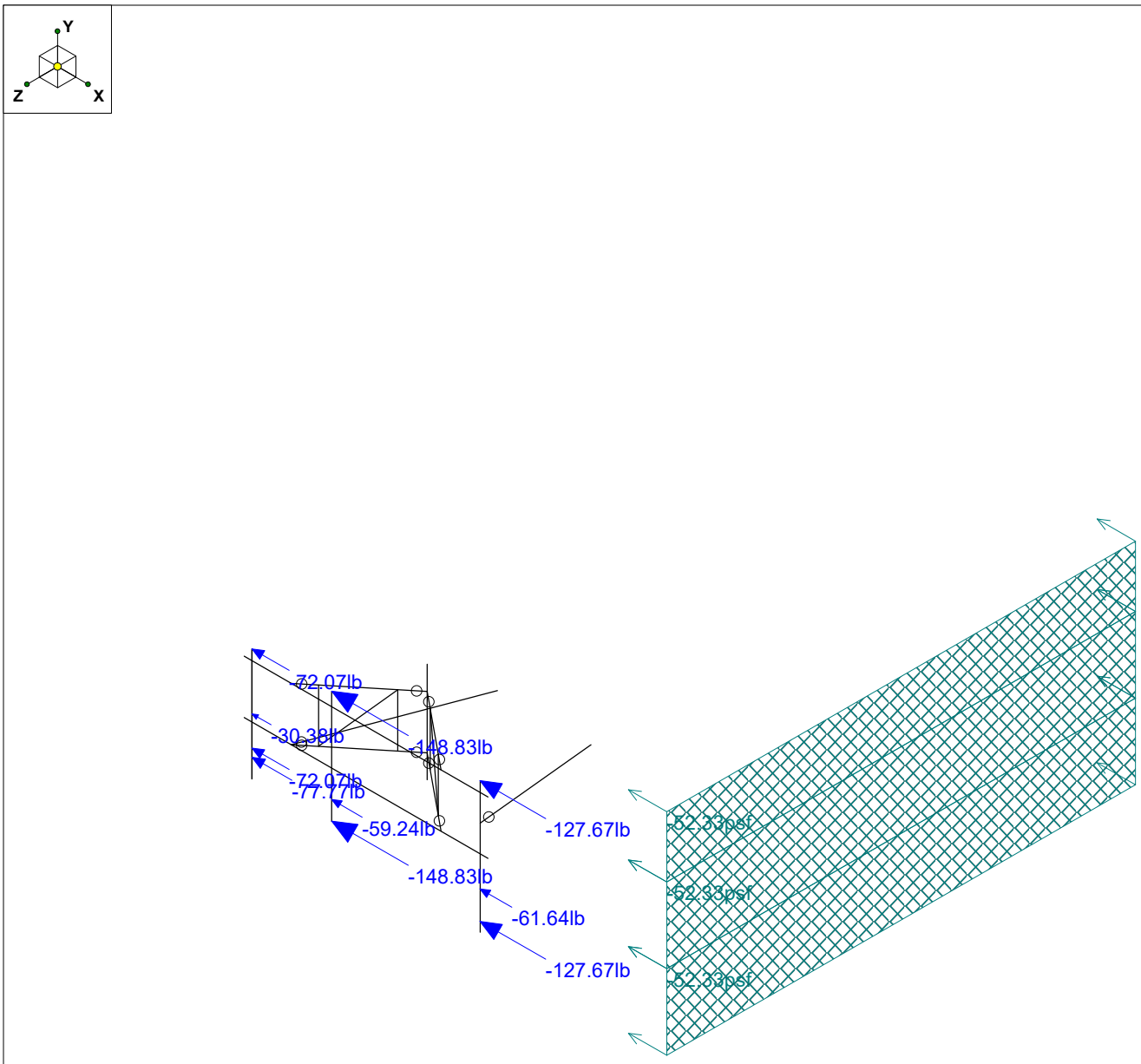
Infinigy Engineering	842862	Dead Load
CLK		Jan 22, 2019 at 1:27 PM
1039-A0002-B		842862 mod.r3d





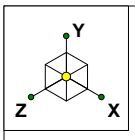
Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution

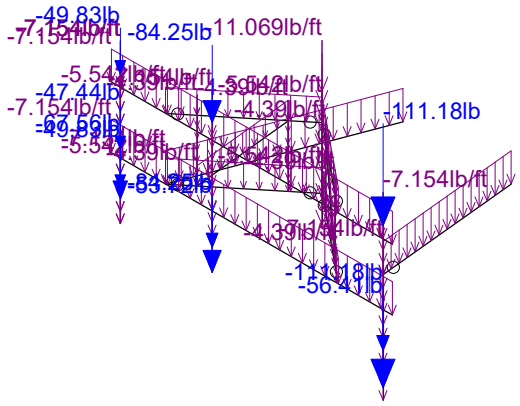
Infinigy Engineering	842862	Wind Load 000
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d



Loads: BLC 3, Wind Load AZI 090
Envelope Only Solution

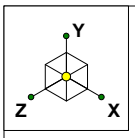
Infinigy Engineering	842862	Wind Load 090
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d

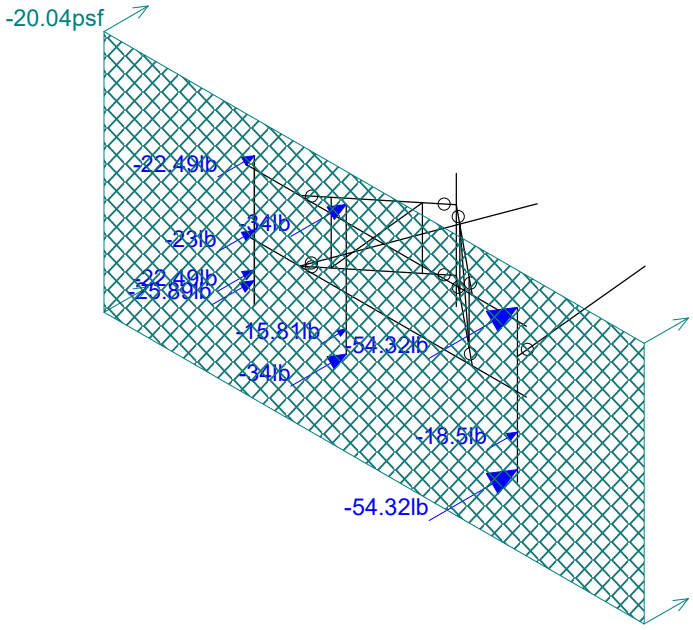




Loads: BLC 4, Ice Weight
Envelope Only Solution

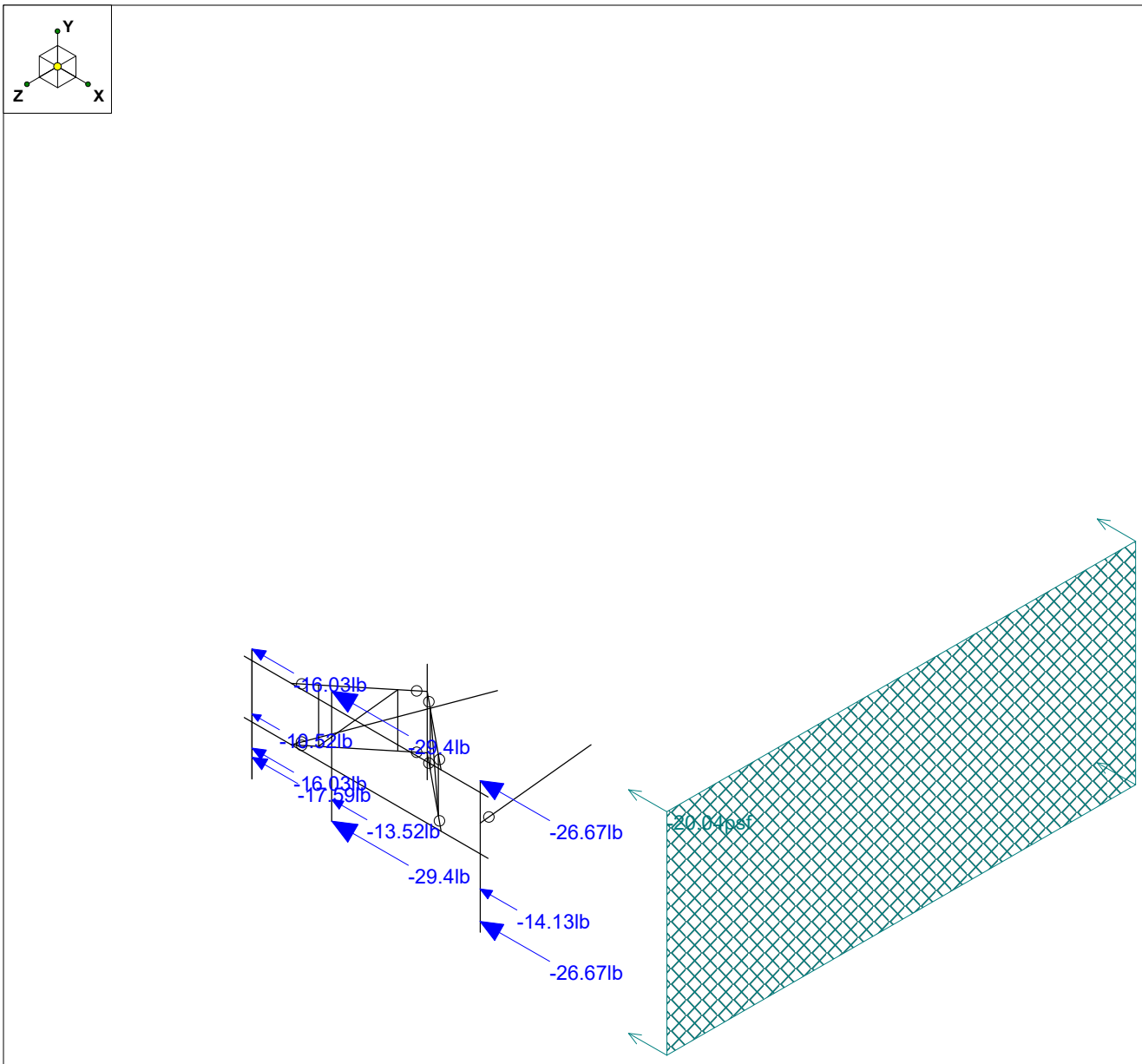
Infinigy Engineering	842862	Ice Load
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d





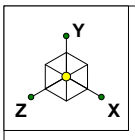
Loads: BLC 5, Wind + Ice Load AZI 000
Envelope Only Solution

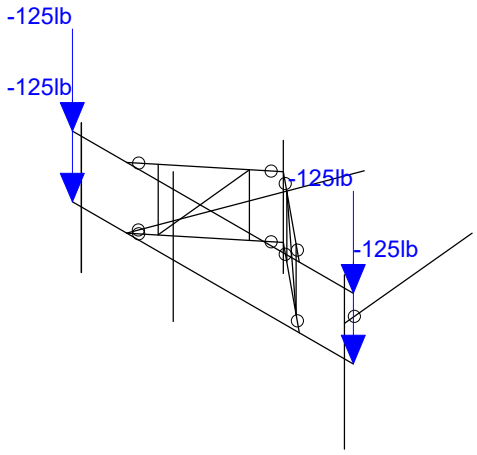
Infinigy Engineering	842862	Wind + Ice Load 000
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d



Loads: BLC 6, Wind + Ice Load AZI 090
Envelope Only Solution

Infinigy Engineering	842862	Wind + Ice Load 090
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d





Loads: BLC 7, Service Live 1
Envelope Only Solution

Infinigy Engineering	842862	Service Load
CLK		Jan 22, 2019 at 1:28 PM
1039-A0002-B		842862 mod.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	East Haven South
Client:	CCI
Carrier:	ATT
Engineer:	CLK
Date:	1/22/2019

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2015 IBC
Structure Load Standard:	TIA-222-H
Antenna Load Standard:	TIA-222-H
Structure Risk Category:	II
Structure Type:	Mount - Sector
Number of Sectors:	3
Structure Shape 2:	Round

Rooftop Inputs:

Rooftop Wind Speed-Up?:	No

Wind Loading Inputs:

Design Wind Velocity:	127	mph (ultimate 3-second gust)
Wind Centerline 2 (z_2):	54.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
43.60	1.00	**52.33**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
6.76	1.00	**20.04**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (ultimate 3-second gust)
Base Ice Thickness:	1.28	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
Kathrein 80010121	55.0	3	1.00	Flat	Flat	43.77	5.16	225.94	144.13	164.59	205.49
Kathrein 80010965	55.0	3	1.00	Flat	Flat	43.77	13.81	604.68	255.34	342.68	517.35
Quintel QS66512-6___	55.0	3	1.00	Flat	Flat	43.77	8.13	356.03	297.66	312.25	341.43
Powerwave LGP21401_	55.0	6	1.00	Flat	Flat	43.77	1.10	48.33	15.19	23.48	40.04
Raycap DC6-48-60-18-8C__	55.0	1	1.00	Flat	Flat	43.77	2.73	119.33	119.33	119.33	119.33
Raycap_DC6-48-60-18-8F__	55.0	2	1.00	Flat	Flat	43.77	2.90	126.98	126.98	126.98	126.98
Ericsson RRUS_4449 B5/B12_	55.0	3	1.00	Flat	Flat	43.77	1.97	86.13	61.64	67.76	80.00
Ericsson RRUS 8843 B2/B66A_	55.0	3	1.00	Flat	Flat	43.77	1.64	71.75	59.24	62.37	68.62
Ericsson RRUS_32	55.0	3	1.00	Flat	Flat	43.77	2.86	125.06	77.77	89.59	113.24

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N15	N28		270	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
2	M3	N1	N14		180	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
3	MP1	N31	N33			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
4	MP2	N35	N36			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
5	MP4	N32	N34			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
6	M18	N66A	N40		180	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
7	M19	N67A	N39		270	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
8	M20	N40	N64A		180	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
9	M21	N39	N65A		270	Pipe 1.5	Beam	Pipe	A53 Gr.B	Typical
10	MP3	N44A	N45A			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
11	M16	N31	N33			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
12	M14	N62	N63			SR 7/8	Beam	RECT	A36 Gr.36	Typical
13	M15	N63	N59			SR 7/8	Beam	RECT	A36 Gr.36	Typical
14	M16B	N59	N60			SR 7/8	Beam	RECT	A36 Gr.36	Typical
15	M17A	N56A	N57			SR 7/8	Beam	RECT	A36 Gr.36	Typical
16	M18A	N57	N53A			SR 7/8	Beam	RECT	A36 Gr.36	Typical
17	M19A	N53A	N54A			SR 7/8	Beam	RECT	A36 Gr.36	Typical
18	M18B	N57A	N58			PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical
19	M19B	N67A	N60A			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
20	M20A	N65A	N64			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical
21	M21A	N65B	N65			Pipe 2.375	Beam	Pipe	A53 Gr.B	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	Hot Rolled Steel				
2	A36 Gr.36	SR 7/8	6	235	0
3	A53 Gr.B	PIPE_1.5	6	559.4	.1
4	A53 Gr.B	PIPE_2.0	8	695.9	.2
5	A53 Gr.B	PIPE_4.0	1	64	0
6	Total HR Steel		21	1554.3	.4

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	DL		-1			11			
2	Wind Load AZI 000	WLZ					11		3	
3	Wind Load AZI 090	WLX					11		3	
4	Ice Weight	OL1					11	21		
5	Wind + Ice Load AZI ...	OL2					11		1	
6	Wind + Ice Load AZI ...	OL3					11		1	
7	Service Live 1	LL					4			
8	BLC 2 Transient Area...	None						25		
9	BLC 3 Transient Area...	None						23		
10	BLC 5 Transient Area...	None						19		
11	BLC 6 Transient Area...	None						17		

Load Combinations

	Description	S...	PD...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	F...	B...	Fa...	...	...	...	F...	F...	F...	F...	F...	F...
1	1.4D	Yes	Y		DL	1.4																	
2	1.2D + 1W AZI 000	Yes	Y		DL	1.2	WLZ	1															
3	1.2D + 1W AZI 030	Yes	Y		DL	1.2	WLZ	.866	WLX	.5													
4	1.2D + 1W AZI 060	Yes	Y		DL	1.2	WLZ	.5	WLX	.866													

Load Combinations (Continued)

	Description	S...	PD...	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	F...	B...	Fa...	...	...	...	F...	F...	F...	F...	F...	F...
5	1.2D + 1W AZI 090	Yes	Y		DL	1.2			WLX	1													
6	1.2D + 1W AZI 120	Yes	Y		DL	1.2	WLZ	-.5	WLX	.866													
7	1.2D + 1W AZI 150	Yes	Y		DL	1.2	WLZ	-.866	WLX	.5													
8	1.2D + 1W AZI 180	Yes	Y		DL	1.2	WLZ	-1															
9	1.2D + 1W AZI 210	Yes	Y		DL	1.2	WLZ	-.866	WLX	-.5													
10	1.2D + 1W AZI 240	Yes	Y		DL	1.2	WLZ	-.5	WLX	-.866													
11	1.2D + 1W AZI 270	Yes	Y		DL	1.2			WLX	-1													
12	1.2D + 1W AZI 300	Yes	Y		DL	1.2	WLZ	.5	WLX	-.866													
13	1.2D + 1W AZI 330	Yes	Y		DL	1.2	WLZ	.866	WLX	-.5													
14	0.9D + 1W AZI 000	Yes	Y		DL	.9	WLZ	1															
15	0.9D + 1W AZI 030	Yes	Y		DL	.9	WLZ	.866	WLX	.5													
16	0.9D + 1W AZI 060	Yes	Y		DL	.9	WLZ	.5	WLX	.866													
17	0.9D + 1W AZI 090	Yes	Y		DL	.9			WLX	1													
18	0.9D + 1W AZI 120	Yes	Y		DL	.9	WLZ	-.5	WLX	.866													
19	0.9D + 1W AZI 150	Yes	Y		DL	.9	WLZ	-.866	WLX	.5													
20	0.9D + 1W AZI 180	Yes	Y		DL	.9	WLZ	-1															
21	0.9D + 1W AZI 210	Yes	Y		DL	.9	WLZ	-.866	WLX	-.5													
22	0.9D + 1W AZI 240	Yes	Y		DL	.9	WLZ	-.5	WLX	-.866													
23	0.9D + 1W AZI 270	Yes	Y		DL	.9			WLX	-1													
24	0.9D + 1W AZI 300	Yes	Y		DL	.9	WLZ	.5	WLX	-.866													
25	0.9D + 1W AZI 330	Yes	Y		DL	.9	WLZ	.866	WLX	-.5													
26	1.2D + 1.0Di	Yes	Y		DL	1.2	OL1	1															
27	1.2D + 1.0Di + 1.0Wi AZI 000	Yes	Y		DL	1.2	OL1	1	OL2	1													
28	1.2D + 1.0Di + 1.0Wi AZI 030	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5											
29	1.2D + 1.0Di + 1.0Wi AZI 060	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.8...											
30	1.2D + 1.0Di + 1.0Wi AZI 090	Yes	Y		DL	1.2	OL1	1			OL3	1											
31	1.2D + 1.0Di + 1.0Wi AZI 120	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.8...											
32	1.2D + 1.0Di + 1.0Wi AZI 150	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5											
33	1.2D + 1.0Di + 1.0Wi AZI 180	Yes	Y		DL	1.2	OL1	1	OL2	-1													
34	1.2D + 1.0Di + 1.0Wi AZI 210	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5											
35	1.2D + 1.0Di + 1.0Wi AZI 240	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-....											
36	1.2D + 1.0Di + 1.0Wi AZI 270	Yes	Y		DL	1.2	OL1	1			OL3	-1											
37	1.2D + 1.0Di + 1.0Wi AZI 300	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-....											
38	1.2D + 1.0Di + 1.0Wi AZI 330	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5											
39	1.2D + 1.5L + 1.0WL (30 mph) AZI 000	Yes	Y		DL	1.2	LL	1.5	WLZ	.056													
40	1.2D + 1.5L + 1.0WL (30 mph) AZI 030	Yes	Y		DL	1.2	LL	1.5	WLZ	.048	W...	.0...											
41	1.2D + 1.5L + 1.0WL (30 mph) AZI 060	Yes	Y		DL	1.2	LL	1.5	WLZ	.028	W...	.0...											
42	1.2D + 1.5L + 1.0WL (30 mph) AZI 090	Yes	Y		DL	1.2	LL	1.5			W...	.0...											
43	1.2D + 1.5L + 1.0WL (30 mph) AZI 120	Yes	Y		DL	1.2	LL	1.5	WLZ	-.028	W...	.0...											
44	1.2D + 1.5L + 1.0WL (30 mph) AZI 150	Yes	Y		DL	1.2	LL	1.5	WLZ	-.048	W...	.0...											
45	1.2D + 1.5L + 1.0WL (30 mph) AZI 180	Yes	Y		DL	1.2	LL	1.5	WLZ	-.056													
46	1.2D + 1.5L + 1.0WL (30 mph) AZI 210	Yes	Y		DL	1.2	LL	1.5	WLZ	-.048	W...	-....											
47	1.2D + 1.5L + 1.0WL (30 mph) AZI 240	Yes	Y		DL	1.2	LL	1.5	WLZ	-.028	W...	-....											
48	1.2D + 1.5L + 1.0WL (30 mph) AZI 270	Yes	Y		DL	1.2	LL	1.5			W...	-....											
49	1.2D + 1.5L + 1.0WL (30 mph) AZI 300	Yes	Y		DL	1.2	LL	1.5	WLZ	.028	W...	-....											
50	1.2D + 1.5L + 1.0WL (30 mph) AZI 330	Yes	Y		DL	1.2	LL	1.5	WLZ	.048	W...	-....											

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	N60A	max	648.68	22	49.647	35	1917.317	4	0	50	0	50	0	50
2		min	-680.786	4	11.312	15	-1835.177	22	0	1	0	1	0	1
3	N61	max	411.339	4	1246.525	33	-460.331	25	.88	32	0	50	.267	5
4		min	-256.387	22	317.355	14	-2213.15	33	.11	24	0	1	-.201	23
5	N62A	max	1774.171	17	1138.308	33	2334.736	37	.916	12	0	50	.86	11
6		min	-1907.485	11	296.428	14	-830.77	18	-.389	17	0	1	-.805	17

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
7	N64	max	0	50	0	50	0	50	0	50	0	50	0	50
8		min	0	1	0	1	0	1	0	1	0	1	0	1
9	N65	max	172.799	2	135.153	2	678.867	2	0	50	0	50	0	50
10		min	-164.585	20	-96.632	20	-642.59	20	0	1	0	1	0	1
11	Totals:	max	1633.712	17	2468.132	38	2406.215	14						
12		min	-1633.712	11	755.424	14	-2406.215	8						

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

	Member	Shape	Code Ch...	Loc[in]	LC	Shear Check	Loc.....	LC	phi*Pnc [lb]	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M3	PIPE_1.5	.824	30.875	8	.350	126...	8	13435.903	23593.5	1.105	1.105	1	H1-1b
2	M19	PIPE_1.5	.671	48.962	37	.102	61....	34	14303.694	23593.5	1.105	1.105	1...	H1-1b
3	M18	PIPE_1.5	.658	48.962	27	.111	61....	33	14303.694	23593.5	1.105	1.105	1...	H1-1b
4	MP4	PIPE_2.0	.603	22.75	2	.279	22.75	2	17855.085	32130	1.872	1.872	3...	H3-6
5	M20	PIPE_1.5	.561	12.885	33	.109	0	8	14303.694	23593.5	1.105	1.105	1...	H1-1b
6	M21	PIPE_1.5	.548	12.885	33	.233	49....	8	14303.694	23593.5	1.105	1.105	1...	H1-1b
7	M1	PIPE_1.5	.372	149.5	41	.165	149.5	8	10643.57	23593.5	1.105	1.105	1	H1-1b
8	MP2	PIPE_2.0	.370	42	2	.107	42	8	20866.733	32130	1.872	1.872	1...	H1-1b
9	M16B	SR 7/8	.364	34	38	.034	0	8	5623.183	19482....	.284	.284	2...	H1-1b
10	M19A	SR 7/8	.306	0	33	.046	0	8	5623.183	19482....	.284	.284	2...	H1-1b
11	M14	SR 7/8	.249	34	27	.051	34	8	5623.183	19482....	.284	.284	2...	H1-1b
12	M15	SR 7/8	.232	0	38	.020	0	2	2651.06	19482....	.284	.284	2...	H1-1b
13	M17A	SR 7/8	.205	0	33	.038	0	8	5623.183	19482....	.284	.284	2...	H1-1b
14	M18A	SR 7/8	.191	0	33	.030	0	8	2651.06	19482....	.284	.284	2...	H1-1b
15	M19B	PIPE_2.0	.153	0	4	.005	102...	36	13390.324	32130	1.872	1.872	1...	H1-1b*
16	MP1	PIPE_2.0	.136	40.5	8	.091	40.5	8	20866.733	32130	1.872	1.872	1...	H1-1b
17	M16	PIPE_2.0	.129	40.5	48	.080	40.5	8	20866.733	32130	1.872	1.872	1...	H1-1b
18	M18B	PIPE_4.0	.121	56	11	.103	56	11	85130.772	93240	10.631	10.631	3...	H1-1b
19	M21A	PIPE_2.0	.060	50.324	12	.005	100...	36	13823.067	32130	1.872	1.872	1...	H1-1b

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	SR 7/8	SR 7/8	Beam	RECT	A36 Gr.36	Typical	.601	.029	.029	.058
2	Pipe 2.375	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	Pipe 2.875	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
4	Pipe 1.5	PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical	.749	.293	.293	.586
5	PIPE_4.0	PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N40						
2	N39						
3	N57A						
4	N58						
5	N59A						
6	N60A	Reaction	Reaction	Reaction			
7	N25						
8	N64A						
9	N53A						
10	N54A						
11	N56A						
12	N61	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
13	N62A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
14	N64	Reaction	Reaction	Reaction			
15	N65	Reaction	Reaction	Reaction			

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M3						Yes				None
3	MP1						Yes				None
4	MP2						Yes				None
5	MP4						Yes				None
6	M18	BenPIN	BenPIN				Yes				None
7	M19	BenPIN	BenPIN				Yes				None
8	M20	BenPIN	BenPIN				Yes				None
9	M21	BenPIN	BenPIN				Yes				None
10	MP3						Yes			Inactive	None
11	M16						Yes				None
12	M14						Yes				None
13	M15						Yes				None
14	M16B						Yes				None
15	M17A						Yes				None
16	M18A						Yes				None
17	M19A						Yes				None
18	M18B						Yes				None
19	M19B	BenPIN					Yes				None
20	M20A	BenPIN					Yes			Inactive	None
21	M21A	BenPIN					Yes				None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Pipe 1.5	156	78	78	78	78	78				Lateral
2	M3	Pipe 1.5	156	82	82	82	82	82	.8	.8		Lateral
3	MP1	Pipe 2.375	72			Lbyy						Lateral
4	MP2	Pipe 2.375	72			Lbyy						Lateral
5	MP4	Pipe 2.375	84			Lbyy						Lateral
6	M18	Pipe 1.5	61.847		33	Lbyy						Lateral
7	M19	Pipe 1.5	61.847		33	Lbyy						Lateral
8	M20	Pipe 1.5	61.847		33	Lbyy						Lateral
9	M21	Pipe 1.5	61.847		33	Lbyy						Lateral
10	MP3	Pipe 2.375	96			Lbyy						Lateral
11	M16	Pipe 2.375	72			Lbyy						Lateral
12	M14	SR 7/8	34			Lbyy						Lateral
13	M15	SR 7/8	49.518			Lbyy						Lateral
14	M16B	SR 7/8	34			Lbyy						Lateral
15	M17A	SR 7/8	34			Lbyy						Lateral
16	M18A	SR 7/8	49.518			Lbyy						Lateral
17	M19A	SR 7/8	34			Lbyy						Lateral
18	M18B	PIPE_4.0	64			Lbyy						Lateral
19	M19B	Pipe 2.375	102.528			Lbyy						Lateral
20	M20A	Pipe 2.375	96.747			Lbyy						Lateral
21	M21A	Pipe 2.375	100.648			Lbyy						Lateral

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2/...
No Data to Print ...			

Member Point Loads (BLC 1 : Self Weight)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	Y	-23.15	0
2	MP4	Y	-48.8	0
3	MP2	Y	-55.5	0
4	MP1	Y	-14.1	36
5	MP4	Y	-71	60
6	MP2	Y	-72	60
7	MP1	Y	-55.12	60
8	MP1	Y	-23.15	55
9	MP4	Y	-48.8	78
10	MP2	Y	-55.5	72
11	MP1	Y	-14.1	36

Member Point Loads (BLC 2 : Wind Load AZI 000)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	Z	-112.97	0
2	MP4	Z	-302.34	0
3	MP2	Z	-178.01	0
4	MP1	Z	-48.33	36
5	MP4	Z	-86.13	60
6	MP2	Z	-71.75	60
7	MP1	Z	-125.06	60
8	MP1	Z	-112.97	55
9	MP4	Z	-302.34	78
10	MP2	Z	-178.01	72
11	MP1	Z	-48.33	36

Member Point Loads (BLC 3 : Wind Load AZI 090)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	X	-72.07	0
2	MP4	X	-127.67	0
3	MP2	X	-148.83	0
4	MP1	X	-15.19	36
5	MP4	X	-61.64	60
6	MP2	X	-59.24	60
7	MP1	X	-77.77	60
8	MP1	X	-72.07	55
9	MP4	X	-127.67	78
10	MP2	X	-148.83	72
11	MP1	X	-15.19	36

Member Point Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	Y	-49.83	0
2	MP4	Y	-111.18	0
3	MP2	Y	-84.25	0
4	MP1	Y	-23.72	36
5	MP4	Y	-56.41	60
6	MP2	Y	-53.72	60
7	MP1	Y	-67.56	60

Member Point Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
8	MP1	Y	-49.83	55
9	MP4	Y	-111.18	78
10	MP2	Y	-84.25	72
11	MP1	Y	-23.72	36

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	Z	-22.49	0
2	MP4	Z	-54.32	0
3	MP2	Z	-34	0
4	MP1	Z	-11.5	36
5	MP4	Z	-18.5	60
6	MP2	Z	-15.81	60
7	MP1	Z	-25.89	60
8	MP1	Z	-22.49	55
9	MP4	Z	-54.32	78
10	MP2	Z	-34	72
11	MP1	Z	-11.5	36

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	MP1	X	-16.03	0
2	MP4	X	-26.67	0
3	MP2	X	-29.4	0
4	MP1	X	-5.26	36
5	MP4	X	-14.13	60
6	MP2	X	-13.52	60
7	MP1	X	-17.59	60
8	MP1	X	-16.03	55
9	MP4	X	-26.67	78
10	MP2	X	-29.4	72
11	MP1	X	-5.26	36

Member Point Loads (BLC 7 : Service Live 1)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[in,%]
1	M1	Y	-125	0
2	M3	Y	-125	0
3	M1	Y	-125	%100
4	M3	Y	-125	%100

Member Distributed Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M1	Y	-7.154	-7.154	0	%100
2	M3	Y	-7.154	-7.154	0	%100
3	MP1	Y	-7.154	-7.154	0	%100
4	MP2	Y	-7.154	-7.154	0	%100
5	MP4	Y	-7.154	-7.154	0	%100
6	M18	Y	-5.542	-5.542	0	%100
7	M19	Y	-5.542	-5.542	0	%100
8	M20	Y	-5.542	-5.542	0	%100
9	M21	Y	-5.542	-5.542	0	%100
10	MP3	Y	-7.154	-7.154	0	%100
11	M16	Y	-7.154	-7.154	0	%100
12	M14	Y	-4.39	-4.39	0	%100

Member Distributed Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
13	M15	Y	-4.39	-4.39	0	%100
14	M16B	Y	-4.39	-4.39	0	%100
15	M17A	Y	-4.39	-4.39	0	%100
16	M18A	Y	-4.39	-4.39	0	%100
17	M19A	Y	-4.39	-4.39	0	%100
18	M18B	Y	-11.069	-11.069	0	%100
19	M19B	Y	-7.154	-7.154	0	%100
20	M20A	Y	-7.154	-7.154	0	%100
21	M21A	Y	-7.154	-7.154	0	%100

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

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M1	Z	-8.286	-8.286	0	156
2	M3	Z	-8.286	-8.286	0	156
3	MP1	Z	-10.357	-10.357	0	44.5
4	MP2	Z	-10.357	-10.357	0	46.5
5	MP4	Z	-10.357	-10.357	0	44.5
6	M18	Z	-6.431	-6.431	0	61.847
7	M19	Z	-6.431	-6.431	0	61.847
8	M20	Z	-6.431	-6.431	0	61.847
9	M21	Z	-6.431	-6.431	0	61.847
10	M16	Z	-10.357	-10.357	0	44.5
11	M14	Z	-3.816	-3.816	0	34
12	M15	Z	-3.391	-3.391	0	49.518
13	M16B	Z	-3.816	-3.816	0	34
14	M17A	Z	-3.816	-3.816	0	34
15	M18A	Z	-3.391	-3.391	0	49.518
16	M19A	Z	-3.816	-3.816	0	34
17	M18B	Z	-19.624	-19.624	5	53
18	M19B	Z	-3.637	-3.637	0	102.528
19	M21A	Z	-3.111	-3.111	0	100.648
20	M18B	Z	-19.624	-19.624	0	5
21	MP1	Z	-10.357	-10.357	44.5	72
22	MP2	Z	-10.357	-10.357	46.5	72
23	MP4	Z	-10.357	-10.357	44.5	84
24	M16	Z	-10.357	-10.357	44.5	72
25	M18B	Z	-19.624	-19.624	53	64

Member Distributed Loads (BLC 9 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M18B	X	-19.624	-19.624	0	5
2	MP1	X	-10.357	-10.357	44.5	72
3	MP2	X	-10.357	-10.357	46.5	72
4	MP4	X	-10.357	-10.357	44.5	84
5	M16	X	-10.357	-10.357	44.5	72
6	M18B	X	-19.624	-19.624	53	64
7	MP1	X	-10.357	-10.357	0	44.5
8	MP2	X	-10.357	-10.357	0	46.5
9	MP4	X	-10.357	-10.357	0	44.5
10	M18	X	-5.225	-5.225	0	61.847
11	M19	X	-5.225	-5.225	0	61.847
12	M20	X	-5.225	-5.225	0	61.847
13	M21	X	-5.225	-5.225	0	61.847
14	M16	X	-10.357	-10.357	0	44.5
15	M14	X	-3.816	-3.816	0	34
16	M15	X	-3.15	-3.15	0	49.518

Member Distributed Loads (BLC 9 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
17	M16B	X	-3.816	-3.816	0	34
18	M17A	X	-3.816	-3.816	0	34
19	M18A	X	-3.15	-3.15	0	49.518
20	M19A	X	-3.816	-3.816	0	34
21	M18B	X	-19.624	-19.624	5	53
22	M19B	X	-9.698	-9.698	0	102.528
23	M21A	X	-10.032	-10.032	0	100.648

Member Distributed Loads (BLC 10 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	M1	Z	-3.173	-3.173	0	156
2	M3	Z	-3.173	-3.173	0	156
3	MP1	Z	-3.966	-3.966	0	72
4	MP2	Z	-3.966	-3.966	0	72
5	MP4	Z	-3.966	-3.966	0	84
6	M18	Z	-2.463	-2.463	0	61.847
7	M19	Z	-2.463	-2.463	0	61.847
8	M20	Z	-2.463	-2.463	0	61.847
9	M21	Z	-2.463	-2.463	0	61.847
10	M16	Z	-3.966	-3.966	0	72
11	M14	Z	-1.461	-1.461	0	34
12	M15	Z	-1.299	-1.299	0	49.518
13	M16B	Z	-1.461	-1.461	0	34
14	M17A	Z	-1.461	-1.461	0	34
15	M18A	Z	-1.299	-1.299	0	49.518
16	M19A	Z	-1.461	-1.461	0	34
17	M18B	Z	-7.515	-7.515	0	64
18	M19B	Z	-1.393	-1.393	0	102.528
19	M21A	Z	-1.191	-1.191	0	100.648

Member Distributed Loads (BLC 11 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in..	End Location[in,...
1	MP1	X	-3.966	-3.966	0	72
2	MP2	X	-3.966	-3.966	0	72
3	MP4	X	-3.966	-3.966	0	84
4	M18	X	-2.001	-2.001	0	61.847
5	M19	X	-2.001	-2.001	0	61.847
6	M20	X	-2.001	-2.001	0	61.847
7	M21	X	-2.001	-2.001	0	61.847
8	M16	X	-3.966	-3.966	0	72
9	M14	X	-1.461	-1.461	0	34
10	M15	X	-1.206	-1.206	0	49.518
11	M16B	X	-1.461	-1.461	0	34
12	M17A	X	-1.461	-1.461	0	34
13	M18A	X	-1.206	-1.206	0	49.518
14	M19A	X	-1.461	-1.461	0	34
15	M18B	X	-7.515	-7.515	0	64
16	M19B	X	-3.714	-3.714	0	102.528
17	M21A	X	-3.842	-3.842	0	100.648

Member Area Loads (BLC 2 : Wind Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N123	N119A	N117	N122	Z	Open Structure	-52.33
2	N116	N122	N123	N118A	Z	Open Structure	-52.33

Member Area Loads (BLC 2 : Wind Load AZI 000) (Continued)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
3	N125	N117	N119A	N126	Z	Open Structure	-52.33

Member Area Loads (BLC 3 : Wind Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N118A	N120	N124	N123	X	Open Structure	-52.33
2	N119A	N121	N127	N126	X	Open Structure	-52.33
3	N123	N119A	N121	N124	X	Open Structure	-52.33

Member Area Loads (BLC 5 : Wind + Ice Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N116	N125	N126	N118A	Z	Open Structure	-20.04

Member Area Loads (BLC 6 : Wind + Ice Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N118A	N120	N127	N126	X	Open Structure	-20.04

APPENDIX D

ADDITIONAL CALCUATIONS

Date:	1/22/2019
Client	CCI
Carrier	ATT
Engineer:	CLK
Site:	842862
Job #:	1039-A0002-B

Code:	LRFD
Bolt Diameter	0.625
Bolt Grade:	A325
Threads Excluded?:	
Axial (lbs):	1246.00
Shear (lbs):	2334.00

Bolt Info:

Yield Strength (F_{yb})	92.0 kips
Ultimate Strength (F_{ub})	120.0 kips
Threads/in (n)	11
Gross Area (A_{gb})	0.307 in²
Net Area (A_{nb})	0.226 in²

Bolt Capacity (1/2" A307 Through Bolt), Total of (2) per Connection				
	Ult Load / Bolt	Factored Load (ϕ=0.75)	# of Bolts	Factor Joint Capacity
Axial (lb)	27120.2	20340.1	1	20340
Shear(lb)	16567.0	12425.2	1	12425

Interaction Check	
$T/\phi T_n$	6.1%
$V/\phi Vn$	18.8%
≤1.0	3.9%
	OK

APPENDIX E

Modification Design Drawings

GENERAL NOTES:

1. THESE DOCUMENTS WERE DESIGNED IN ACCORDANCE WITH THE LATEST VERSION OF APPLICABLE LOCAL/STATE/COUNTY/CITY BUILDING CODES, AS WELL AS ANSI/TIA-222 STANDARD, AWWA-D100 STANDARD, NDS, NEC, MSJC, AND/OR THE LATEST VERSION OF THE INTERNATIONAL BUILDING CODE, UNLESS NOTED OTHERWISE IN THE CORRESPONDING STRUCTURAL REPORT.
2. ALL CONSTRUCTION METHODS SHOULD FOLLOW STANDARDS OF GOOD CONSTRUCTION PRACTICE.
3. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN SIMILAR CONSTRUCTION.
4. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. IF OBSTRUCTIONS ARE FOUND, CONTRACTOR SHALL NOTIFY ENGINEER OF RECORD PRIOR TO CONTINUING WORK.
5. ANY CHANGES OR ADDITIONS MUST CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS, AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL CHANGES OR ADDITIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND/OR CONSTRUCTION.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE DURING CONSTRUCTION. TIA-1019-A-2011 IS AN APPROPRIATE REFERENCE FOR THOSE DESIGNS MEETING TIA STANDARDS. THE ENGINEER OF RECORD MAY PROVIDE FORMAL RIGGING PLANS AT THE REQUEST AND EXPENSE OF THE CONTRACTOR.
7. INSTALLATION SHALL NOT INTERFERE NOR DENY ADEQUATE ACCESS TO OR FROM ANY EXISTING OR PROPOSED OPERATIONAL AND SAFETY EQUIPMENT.
8. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ANY FABRICATION. CONTACT INFINIGY ENGINEERING IF ANY DISCREPANCIES EXIST.

STEEL CONSTRUCTION NOTES:

1. STRUCTURAL STEEL SHALL CONFORM TO THE AISC MANUAL OF STEEL CONSTRUCTION 14TH EDITION, FOR THE DESIGN AND FABRICATION OF STEEL COMPONENTS.
2. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES, AND GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS' RECOMMENDATIONS.
3. ALL FIELD DRILLED HOLES TO BE USED FOR FIELD BOLTING INSTALLATION SHALL BE STANDARD HOLES, AS DEFINED BY AISC, UNLESS NOTED OTHERWISE.
4. ALL EXTERIOR STEEL WORK SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
5. ALL STEEL MEMBERS AND CONNECTIONS SHALL MEET THE FOLLOWING GRADES:
   - ANGLES, CHANNELS, PLATES AND BARS TO BE A36. Fy=36 KSI, U.N.O.
   - W SHAPES TO BE A992. Fy=50 KSI, U.N.O.
   - RECTANGULAR HSS TO BE A500, GRADE B. FY=46 KSI, U.N.O.
   - ROUND HSS TO BE A500, GRADE B. FY=42 KSI, U.N.O.
   - STEEL PIPE TO BE A53, GRADE B. Fy=35 KSI, U.N.O.
   - BOLTS TO BE A325-X. Fu=120 KSI, U.N.O.
   - U-BOLTS AND LAG SCREWS TO BE A307 GR A. Fu=60 KSI, U.N.O.
6. ALL WELDING SHALL BE DONE USING E70XX ELECTRODES, U.N.O.
7. ALL WELDING SHALL CONFORM TO AISC AND AWS D1.1 LATEST EDITION.
8. ALL HILTI ANCHORS TO BE CARBON STEEL, U.N.O.
   - MECHANICAL ANCHORS: KWIK BOLT-TZ, U.N.O.
   - CMU BLOCK ANCHORS: ADHESIVE - HY120, U.N.O.
   - CONCRETE ANCHORS: ADHESIVE - HY150, U.N.O.
   - CONCRETE REBAR: ADHESIVE - RE500, U.N.O.
9. ALL STUDS TO BE NELSON CAPACITOR DISCHARGE 1/4"-20 LOW CARBON STEEL COPPER-FLASH AT 55 KSI ULT/50 KSI YIELD, U.N.O.
10. BOLTS SHALL BE TIGHTENED TO A "SNUG TIGHT" CONDITION AS DEFINED BY AISC.
11. MINIMUM EDGE DISTANCES SHALL CONFORM TO AISC TABLE J3.4.

CONCRETE CONSTRUCTION NOTES:

1. CONCRETE TO BE 4000 PSI @ 28 DAYS. REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. CONCRETE INSTALLATION TO CONFORM TO ACI-318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE. ALL CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH FREE OF WATER AND ALL FOREIGN OBJECTS AND MATERIALS. A MINIMUM OF THREE INCHES OF CONCRETE SHALL COVER ALL REINFORCEMENT. WELDING OF REBAR IS NOT PERMITTED.
2. EXISTING CONCRETE SURFACES THAT ARE TO BE IN CONTACT WITH NEW PROPOSED CONCRETE SHOULD BE WIRE BRUSHED CLEAN AND TREATED WITH APPROPRIATE MECHANICAL SCRATCH COAT AND REPAIR MATERIALS OR APPROPRIATE CHEMICAL METHODS SUCH AS THE APPLICATION OF A BONDING AGENT, EX. SAKRETE OR EQUIVALENT, TO ENSURE A QUALITY BOND BETWEEN EXISTING AND PROPOSED CONCRETE SURFACES.

FIBER REINFORCED POLYMER (FRP) NOTES:

1. FRP PLATES, SHAPES, BOLTS AND NUTS (STUD/NUT ASSEMBLIES) SHALL CONFORM TO ASTM D638, 695, 790. PLATES AND SHAPES TO BE FY = 5.35 KSI LW (SAFETY FACTOR OF 8), .945 KSI CW (SAFETY FACTOR OF 8) MIN.
2. IF FIELD FABRICATION IS REQUIRED, ALL CUT EDGES AND DRILLED HOLES TO BE SEALED USING VINYL ESTER SEALING KIT SUPPLIED BY THE MANUFACTURER.
3. ALL FASTENERS TO BE 1/2" DIA FRP THREADED ROD WITH FIBER REINFORCED THERMOPLASTIC NUT, SPACED AT 12 INCHES ON CENTER MAXIMUM, U.N.O., FOR PANELS AND AS DESIGNED FOR STRUCTURAL MEMBERS.
4. THE COLOR AND SURFACE PATTERN OF EXPOSED FRP PANELS SHALL MATCH THE EXTERIOR OF THE EXISTING BUILDING, U.N.O.
5. STUD/NUT ASSEMBLIES SHOULD BE LUBRICATED FOR INSTALLATION
6. ENSURE BEARING SURFACES OF THE NUTS ARE PARALLEL TO THE SURFACES BEING FASTENED.
7. TORQUE BOLTS ACCORDING TO THE FOLLOWING TABLE:

INSTALLATION TORQUE TABLE

SIZE	ULTIMATE TORQUE STRENGTH	RECOMMENDED MAXIMUM INSTALLATION TORQUE
3/8-16 UNC	8 FT-LBS	4 FT-LBS
1/2-13 UNC	18 FT-LBS	8 FT-LBS
5/8-11 UNC	35 FT-LBS	16 FT-LBS
3/4-10 UNC	50 FT-LBS	24 FT-LBS
1-8 UNC	110 FT-LBS	50 FT-LBS

8. WHEN TIGHTENING FRP STUD/NUT ASSEMBLIES, WRENCHES MUST MAKE FULL CONTACT WITH ALL NUT EDGES. A STANDARD SIX POINT SOCKET IS RECOMMENDED.
9. STUD/NUT ASSEMBLIES SHOULD BE BONDED BY APPLYING BONDING AGENT TO ENTIRE NUT AND EXPOSED STUD.
10. ALL FRP MATERIALS TO BE PROVIDED BY FIBERGRATE COMPOSITE STRUCTURES, DALLAS TX, OR APPROVED EQUAL.
11. ALL FRP SHAPES TO BE DYNAFORM PULTRUDED STRUCTURAL SHAPES.
12. ALL FRP PLATES TO BE FIBERPLATE MOLDED FRP PLATE.
13. ALL FRP PANELS TO BE FIBERPLATE CLADDING PANEL.
14. EACH FRP PANEL TO BE IDENTIFIED WITH LARR#25536 AND FIBERGRATE COMPOSITE STRUCTURAL LABEL.
15. FRP MATERIAL TO BE CLASSIFIED AS CC1 OR BETTER, AND HAVE MAXIMUM FLAME SPREAD OF 50.
16. ALL DESIGN AND CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH LOS ANGELES RESEARCH REPORT RR25536, DATED FEBRUARY 1, 2016.
17. SPECIAL INSPECTIONS MUST BE PROVIDED FOR ALL FRP INSTALLMENTS. SEE SPECIAL INSPECTION SECTION, THIS SHEET.

RATIO OF EDGE DISTANCE TO FRP FASTENER DIAMETER

	RANGE	RECOMMENDED
EDGE DISTANCE - CL* BOLT TO END	2.0-4.0	3.0
EDGE DISTANCE - CL* BOLT TO SIDE	1.5-3.5	2.5
BOLT PITCH - CL* TO CL*	4.0-5.0	5.0

WOOD CONSTRUCTION NOTES:

1. ALL EXISTING WOOD SHAPES ARE ASSUMED TO BE DOUGLAS FIR-LARCH WITH A REFERENCE DESIGN BENDING VALUE OF 1000 PSI MIN.
2. ALL PROPOSED WOOD SHAPES ARE TO BE DOUGLAS FIR-LARCH WITH A REFERENCE DESIGN BENDING VALUE OF 1000 PSI MIN. U.N.O.
3. ALL EXISTING AND PROPOSED GLUED LAMINATED TIMBERS ARE TO BE 24F-1.8C DOUGLAS FIR BALANCED WITH A REFERENCE DESIGN BENDING VALUE OF 2400 PSI MIN. U.N.O.

MASONRY CONSTRUCTION NOTES:

1. ALL BRICK TO BE 1500 PSI MIN. REINFORCING BAR (IF APPLICABLE) TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. ALL MORTAR TO BE 2000 PSI MIN.
   - FOR INTERIOR/ABOVE GRADE APPLICATIONS TYPE N MORTAR HAVING MINIMUM MODULUS OF RUPTURE OF 100 PSI SHALL BE USED. FOR EXTERIOR/BELOW GRADE APPLICATIONS TYPE M OR S MORTAR HAVING A MINIMUM MODULUS OF RUPTURE OF 133 PSI.
   - BRICK AND MORTAR INSTALLATION TO CONFORM TO MSJC BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES.
2. ALL CMU TO BE 1500 PSI MIN. REINFORCING BAR (IF APPLICABLE) TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. ALL MORTAR TO BE 2000 PSI MIN.
   - FOR INTERIOR/ABOVE GRADE APPLICATIONS, TYPE N MORTAR HAVING MINIMUM MODULUS OF RUPTURE OF 64 PSI SHALL BE USED FOR UNGROUTED BLOCKS, AND 158 PSI FOR FULLY GROUTED BLOCKS.
   - FOR EXTERIOR/BELOW GRADE APPLICATIONS TYPE M OR S MORTAR HAVING A MINIMUM MODULUS OF RUPTURE OF 84 PSI SHALL BE USED FOR UNGROUTED BLOCKS, AND 163 PSI FOR FULLY GROUTED BLOCKS.
   - BRICK AND MORTAR INSTALLATION TO CONFORM TO MSJC BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES.

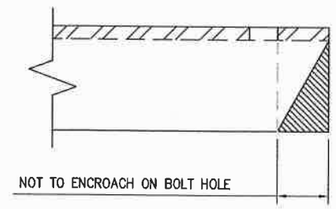
TOWER PLUMB & TENSION NOTES:

1. PLUMB AND TENSION TOWER UPON COMPLETION OF STRUCTURAL MODIFICATIONS DETAILED IN THESE DRAWINGS.
2. RETENSIONING OF EXISTING GUY WIRES SHALL BE PERFORMED AT A TIME WHEN THE WIND VELOCITY IS LESS THAN 10 MPH AT GROUND LEVEL AND WITH NO ICE ON THE STRUCTURE AND GUY WIRES.
3. PLUMB THE TOWER WHILE RETENSIONING THE EXISTING GUY WIRES. THE HORIZONTAL DISTANCE BETWEEN THE VERTICAL CENTERLINES AT ANY TWO ELEVATIONS SHALL NOT EXCEED 0.25% OF THE VERTICAL DISTANCE BETWEEN TWO ELEVATIONS FOR LATTICED STRUCTURES.
4. THE TWIST BETWEEN ANY TWO ELEVATIONS THROUGHOUT THE HEIGHT OF A LATTICE STRUCTURE SHALL NOT EXCEED 0.5 DEGREES IN 10 FEET. THE MAXIMUM TWIST OVER THE LATTICE STRUCTURE HEIGHT SHALL NOT EXCEED 5 DEGREES.

SPECIAL INSPECTIONS NOTES:

1. A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER AND APPROVED BY THE JURISDICTION, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH THE THE GOVERNING BUILDING CODE, APPLICABLE SECTION(S) AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
   a. STRUCTURAL WELDING (CONTINUOUS INSPECTION OF FIELD WELDS ONLY).
   b. HIGH STRENGTH BOLTS (PERIODIC INSPECTION OF A325 AND/OR A490 BOLTS) TO BE TIGHTENED PER "TURN-OF-THE-NUT" METHOD.
   c. MECHANICAL AND EPOXIED ANCHORAGES.
   d. FIBER REINFORCED POLYMER.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT THE FRP MATERIAL SPECIFIED ON THE APPROVED DESIGN DOCUMENTS IS BEING INSTALLED.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT ALL CUT EDGES AND DRILLED HOLES ARE PROPERLY SEALED USING A VINYL ESTER SEALING KIT SUPPLIED BY THE MANUFACTURER.
      - THE SPECIAL INSPECTOR MUST VERIFY THAT THE STRUCTURE IS BUILT IN ACCORDANCE WITH THE APPROVED DESIGN DOCUMENTS.
2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM WORK WITHOUT THE SPECIAL INSPECTIONS.

MAXIMUM ALLOWABLE ANGLE CLIP



INFINIGY
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

at&t

STATE OF CONNECTICUT
JOSEPH R. JOHNSTON
29460
LICENSED
PROFESSIONAL ENGINEER
JAN 28 2019

Joseph Johnston

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appd	Date
0	ISSUED FOR REVIEW	VEB	01/22/19

Drawn: VEB Date: 01/22/19
Designed: CLK Date: 01/22/19
Checked: NRO Date: 01/22/19

Project Number:
1039-A0002-B

Project Title:
BU# 842862
FA# 10071016

EAST HAVEN SOUTH

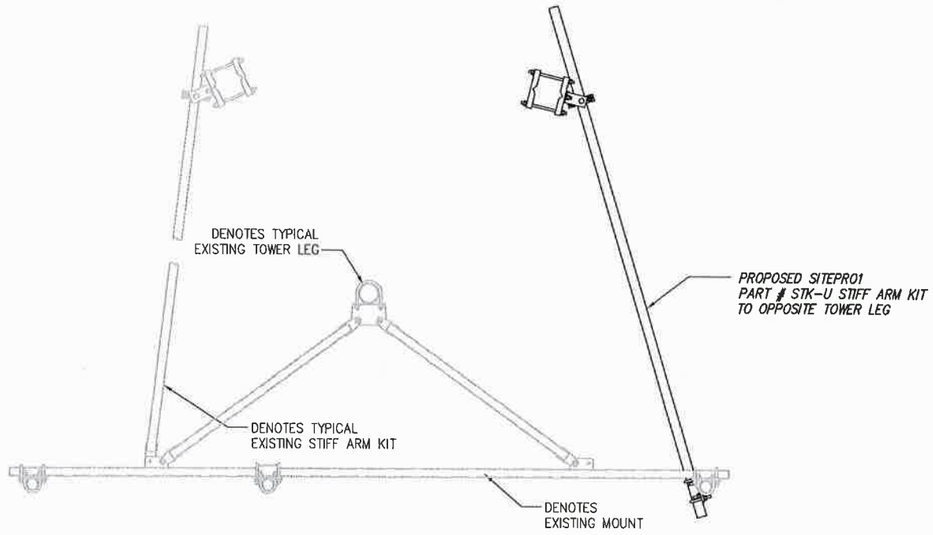
259 COMMERCE RD
EAST HAVEN, CT 06512

Prepared For:
CROWN CASTLE
3 Corporate Park, Suite 101
Clifton Park, NY 12065

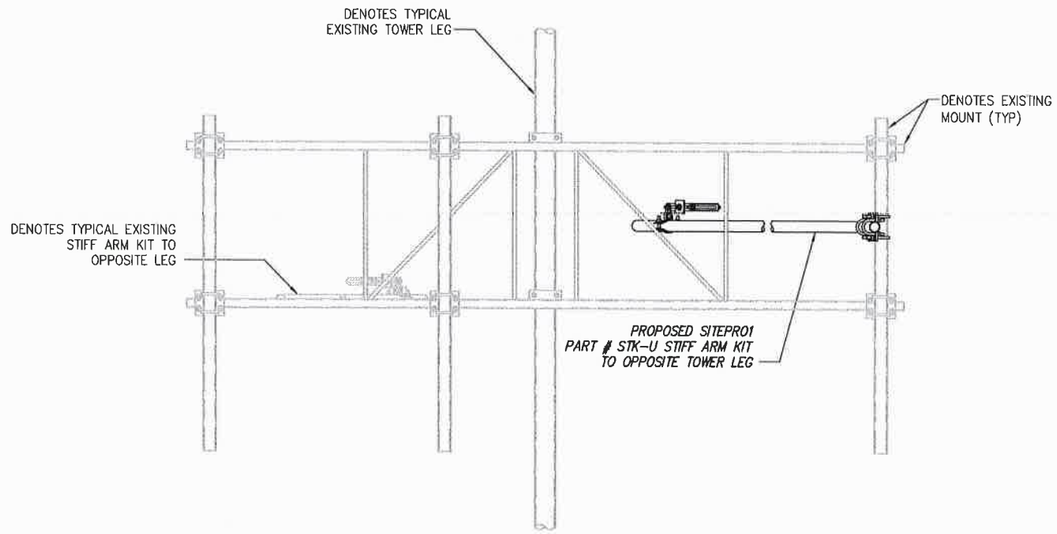
Drawing Scale: AS NOTED
Date: 01/22/19

Drawing Title
GENERAL NOTES

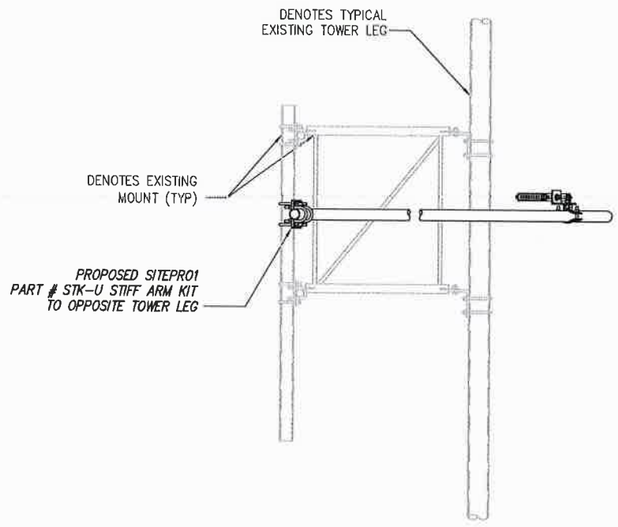
Drawing Number
S-1



1 TOP VIEW
SCALE: NOT TO SCALE



2 ELEVATION VIEW
SCALE: NOT TO SCALE



3 SIDE VIEW
SCALE: NOT TO SCALE

INFINIGY
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

at&t

STATE OF CONNECTICUT
JOSEPH R. JOHNSTON
29460
LICENSED PROFESSIONAL ENGINEER
Joseph R. Johnston
JAN 25 2019

No	Submittal / Revision	Appr'd	Date
0	ISSUED FOR REVIEW	VEB	01/22/19

Drawn: VEB Date: 01/22/19
Designed: CLK Date: 01/22/19
Checked: NRG Date: 01/22/19

Project Number:
1039-A0002-B

Project Title:
BU# 842862
FA# 10071016

EAST HAVEN SOUTH

259 COMMERCE RD
EAST HAVEN, CT 06512

Prepared For:

CROWN CASTLE
3 Corporate Park, Suite 101
Clifton Park, NY 12065

Drawing Scale:
AS NOTED

Date:
01/22/19

Drawing Title
MOUNT MODIFICATION

Drawing Number
S-2

RF EMISSIONS COMPLIANCE REPORT

Crown Castle on Behalf of AT&T Mobility, LLC

Site: EAST HAVEN SOUTH
Crown Castle Site ID: 842862
App ID: 471828
259 COMMERCE STREET
EAST HAVEN, CT
1/14/2019

Report Status:

AT&T Mobility, LLC Is Compliant

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive, Suite 315 Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
EAST HAVEN, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "EAST HAVEN SOUTH" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 8.295% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 12.931% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

AT&T Mobility, LLC
EAST HAVEN SOUTH
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.601 %
AT&T Mobility, LLC (Proposed)	2.651 %
AT&T Mobility, LLC (Proposed)	2.34 %
AT&T Mobility, LLC (Proposed)	2.703 %
T-Mobile	0.832 %
T-Mobile	1.425 %
T-Mobile	0.832 %
Metro PCS	1.549 %
Composite Site MPE:	12.931 %

AT&T Mobility, LLC
EAST HAVEN SOUTH
Carrier Summary

Frequency:	869	MHz
Maximum Permissible Exposure (MPE):	579.33	µW/cm^2
Maximum power density at ground level:	3.47988	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.60067	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10121	55	10	521	1.894265	0.326973	3.054124	0.527179
Kathrein-Scala	800-10121	55	120	521	1.894265	0.326973	3.054124	0.527179
Kathrein-Scala	800-10121	55	240	521	1.894265	0.326973	3.054124	0.527179

AT&T Mobility, LLC (Proposed)
EAST HAVEN SOUTH
Carrier Summary

Frequency:	2110	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	26.50507	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	2.65051	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Quintel	QS66512-6	55	10	4788	15.66221	1.566221	25.807699	2.58077
Quintel	QS66512-6	55	120	4788	15.883303	1.58833	25.807701	2.58077
Quintel	QS66512-6	55	240	4788	15.662205	1.56622	25.807701	2.58077

AT&T Mobility, LLC (Proposed)
EAST HAVEN SOUTH
Carrier Summary

Frequency:	1930	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	23.39783	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	2.33978	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	55	10	6168	10.437021	1.043702	21.320002	2.132
Kathrein-Scala	800-10965	55	120	6168	10.437021	1.043702	21.32	2.132
Kathrein-Scala	800-10965	55	240	6168	10.381309	1.038131	21.320002	2.132

AT&T Mobility, LLC (Proposed)
EAST HAVEN SOUTH
Carrier Summary

Frequency:	734	MHz
Maximum Permissible Exposure (MPE):	489.33	µW/cm^2
Maximum power density at ground level:	13.22455	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	2.70257	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10965	55	10	2959	7.048876	1.440506	11.530358	2.35634
Kathrein-Scala	800-10965	55	120	2959	7.048876	1.440506	11.530358	2.35634
Kathrein-Scala	800-10965	55	240	2959	7.048876	1.440506	11.530358	2.35634

T-Mobile
EAST HAVEN SOUTH
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	8.31974	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.83197	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APX16DW-16DWV	47	60	2536	3.071374	0.307137	7.882943	0.788294
RFS	APX16DW-16DWV	47	180	2536	3.071374	0.307137	7.882943	0.788294
RFS	APX16DW-16DWV	47	300	2536	3.071374	0.307137	7.882943	0.788294

T-Mobile
EAST HAVEN SOUTH
Carrier Summary

Frequency:	700	MHz
Maximum Permissible Exposure (MPE):	466.67	µW/cm^2
Maximum power density at ground level:	6.64918	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	1.42482	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
ANDREW	LNX-6515DS-VTM	47	60	1854	3.512951	0.752775	6.40348	1.372174
ANDREW	LNX-6515DS-VTM	47	180	1854	3.512951	0.752775	6.403481	1.372174
ANDREW	LNX-6515DS-VTM	47	300	1854	3.512951	0.752775	6.40348	1.372174

T-Mobile
EAST HAVEN SOUTH
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	8.31974	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.83197	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APX16DW-16DWV	47	60	2536	3.071374	0.307137	7.882943	0.788294
RFS	APX16DW-16DWV	47	180	2536	3.071374	0.307137	7.882943	0.788294
RFS	APX16DW-16DWV	47	300	2536	3.071374	0.307137	7.882943	0.788294

Metro PCS
EAST HAVEN SOUTH
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	15.48931	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	1.54893	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXV18-206517S-C-0	37	0	2912	4.940673	0.494067	14.547076	1.454708
RFS	APXV18-206517S-C-0	37	120	2912	4.940673	0.494067	14.547076	1.454708
RFS	APXV18-206517S-C-0	37	240	2912	5.006185	0.500618	14.547076	1.454708