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

December 26, 2018

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

RE: **Notice of Exempt Modification for Verizon Crown Site BU: 806353**
Verizon Site ID: Wilton CT
128 Mather Street, Wilton, CT 06897
Latitude: 41° 14′ 18.34″ / Longitude-73° 25′ 26.44″

Dear Ms. Bachman:

Verizon currently maintains twelve (12) antennas at the 162-foot level of the existing 180-foot monopole at 128 Mather Street in Wilton, CT. The tower is owned by Crown Castle. The property is owned by the Town of Wilton. Verizon intends to remove three (3) RRUs and install six (6) RRUs and three (3) stiff arm kits.

Per the attached Decision and Order, the construction of the monopole was approved on May 3rd, 1988, by the Connecticut Siting Council.

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 Lynne Vanderslice, First- Selectman – Town of Wilton, the Planning & Zoning, as well as the property owner.

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

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

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

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

For the foregoing reasons, Verizon respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: William Stone.

Sincerely,

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

Attachments:

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

cc:

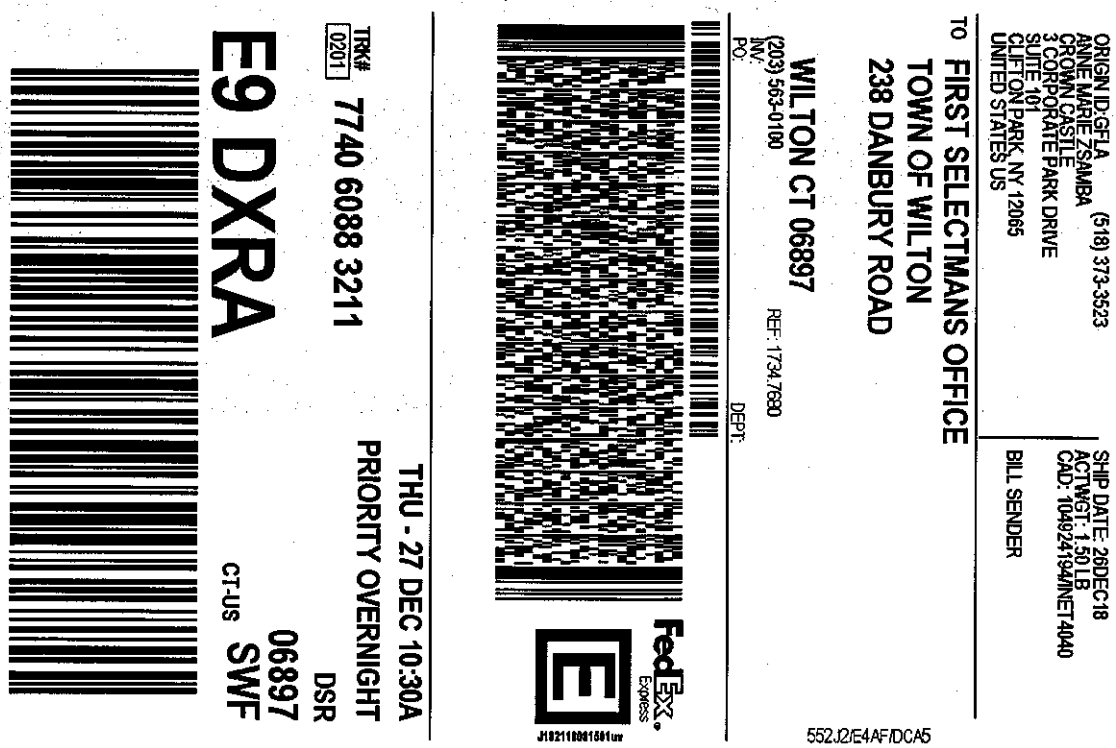
Ms. Lynne Vanderslice
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Planning & Zoning
Wilton Town Hall
238 Danbury Road
Wilton, CT 06897

Town of Wilton
Finance Department
238 Danbury Road
Wilton, CT 06897

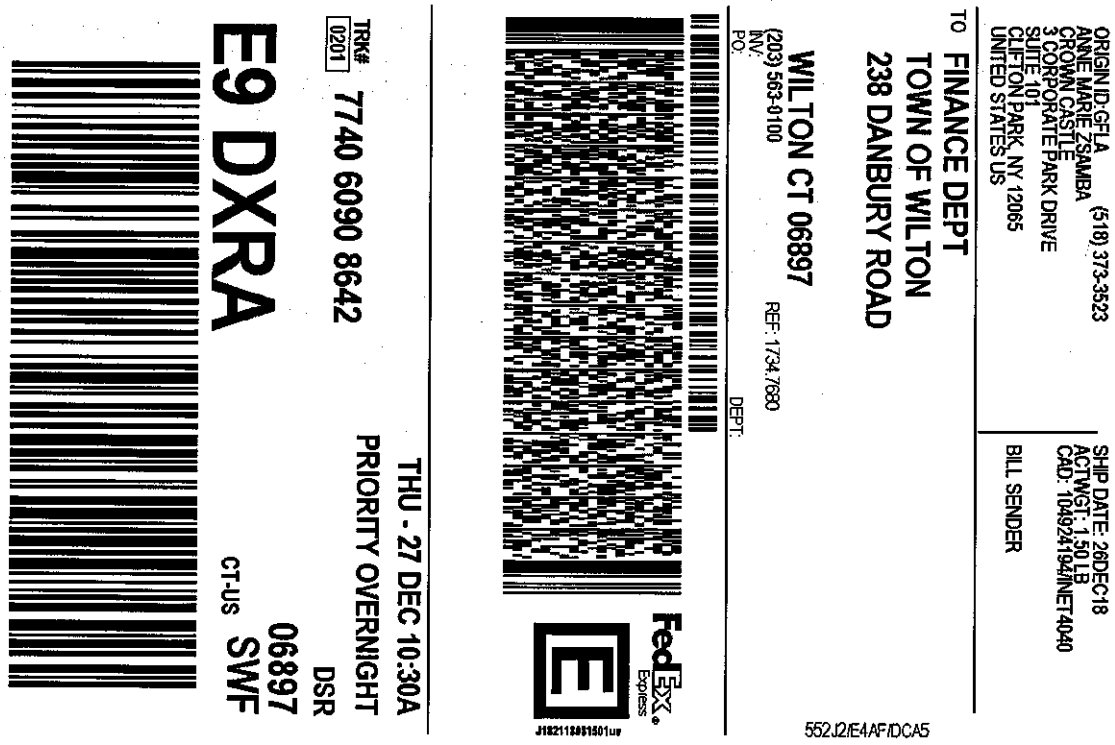
After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.



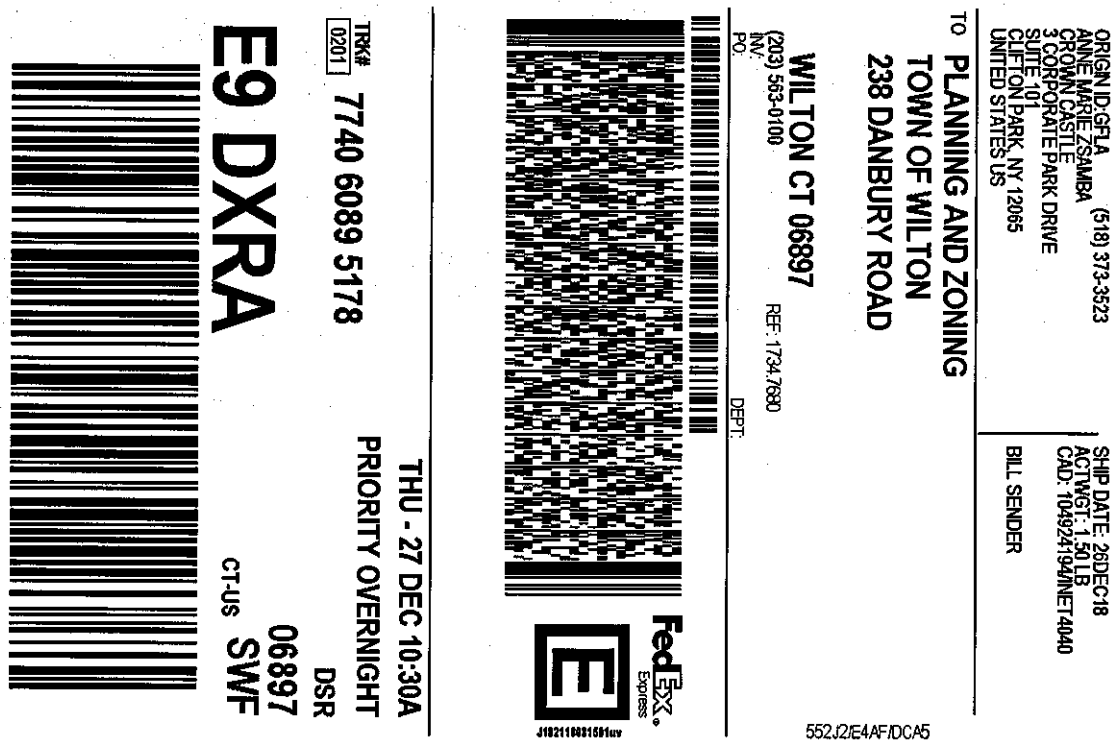
After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.



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.



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.

DOCKET NO. 94 - AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR CELLULAR TELEPHONE ANTENNAS AND ASSOCIATED EQUIPMENT IN THE TOWN OF WILTON, CONNECTICUT.	:	Connecticut Siting Council May 3, 1988

DECISION AND ORDER

Pursuant to the foregoing opinion, the Connecticut Siting Council finds that the effects associated with the construction and operation of a cellular monopole structure at the alternative Mather Street site, including effects on the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish and wildlife, are not significant either alone or cumulatively with other effects, are not in conflict with the policies of the state concerning such effects, and are not sufficient reason to deny the application, and therefore, directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to Metro Mobile CTS of Fairfield County, Inc. (Metro Mobile) for the construction, operation, and maintenance of a cellular telephone tower site and associated equipment at the "Wilton-D/AA" site on Mather Street in Wilton, Connecticut.

The proposed "D-Wilton" site on Richdale Drive and alternative "D/A Wilton" site on Quail Ridge Road are hereby denied.

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

1. The tower shall be constructed as a monopole or lattice tower, as determined by the Council in approving the development and management plan, and be no taller than necessary to provide the proposed service, and in no event shall exceed a total height of 193 feet, including antennas and associated equipment.

2. The facility shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

3. Unless necessary to comply with condition number two, above, no lights shall be installed on this tower.

4. The Certificate Holder shall prepare a development and management (d&m) plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The d&m plan shall provide monopole and lattice tower foundation design specifications and plans for permanent evergreen screening around the outside perimeter of the eight-foot chain link fence which will surround the site.

5. The Certificate Holder shall provide the Council with the results of additional subsurface reconnaissance at the proposed site prior to the commencement of any construction at this site.

6. The Certificate Holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application are added to this facility.

7. The Certificate Holder or its successor shall permit public or private entities to share space on the tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

8. If this facility does not provide, or permanently ceases to provide, cellular service following the completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

9. The Certificate Holder shall comply with any future radio frequency (RF) standards promulated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted in this Decision and Order shall be brought into compliance with such standards.

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

Pursuant to Section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of issuance shall be published in the Norwalk Hour and the Wilton Bulletin.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of State Agencies.

The parties or intervenors to this proceeding are:

Metro Mobile CTS of Fairfield County, Inc. (Party)
50 Rockland Road
South Norwalk, CT 06854
Attn: Michael Riley

Howard L. Slater, Esq. (Its Attorney)
Jennifer Young Gaudet, Esq.
Byrne, Slater, Sandler, Shulman & Rouse, P.C.
330 Main Street
Hartford, CT 06103

Fleischman and Walsh, P.C. (Representative)
1725 N. Street, N.W.
Washington, D.C. 20036
Attn: Richard Rubin, Esq.

PEACE, Inc. (Party)

Ann Caggiano (Representative)
President
PEACE, Inc.
33 Honey Hill Trail
Wilton, CT 06897

Town of Wilton (Party)

Edward C. Desmond (Representative)
First Selectman
Town of Wilton
Town Hall
238 Danbury Road
Wilton, CT 06897

Joseph C. Lee, Esq. (Its Attorney)
Alice A. Bruno, Esq.
Tyler Cooper & Alcorn
205 Church Street
P.O. Box 1936
New Haven, CT 06509

Margaret Doheny (Party)
21 Richdale Drive
Wilton, CT 06897

SNET Cellular, Inc. (Intervenor)

Donald R. Chapman, Vice President (Representative)
Operations
SNET Cellular, Inc.
555 Long Wharf Drive
New Haven, CT 06511

Peter J. Tyrrell (Its Attorney)
Senior Attorney
SNET Cellular, Inc.
227 Church Street
Room 1021
New Haven, CT 06506

Ogden Bigelow (Intervenor)
25 Hidden Lake Road
Wilton, CT 06897

John Jordon (Party)
32 Mayapple Road
Wilton, CT 06897

Veronica Tella (Party)
41 Honey Hill Trail
Wilton, CT 06897

Betsy Mitchell (Party)
125 Catalpa Road
Wilton, CT 06897
(SERVICE WAIVED)

1390E

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in Docket 94 or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 3rd day of May, 1988.

Council Members	Vote Cast
Gloria Dibble Pond Chairperson	Yes
Commissioner Peter Boucher Designee: Roland Miller	Yes
Commissioner Leslie Carothers Designee: Brian Emerick	Yes
Mortimer A. Gelston	Yes
James G. Horsfall	Yes
William H. Smith	Yes
Colin C. Tait	Absent

1395E-2

MATHER ST

Location	MATHER ST	**Mblu**	23/ / 23/ /
Acct#	5165,3335	**Owner**	WILTON TOWN OF
Assessment	$6,999,790	**Appraisal**	$9,999,700
PID	1065	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$45,500	$9,954,200	$9,999,700
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$31,850	$6,967,940	$6,999,790

Owner of Record

Owner	WILTON TOWN OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	238 DANBURY RD WILTON, CT 06897	**Book & Page**	1151/0195
		Sale Date	02/02/1999
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
WILTON TOWN OF	$0		1151/0195	00	02/02/1999
	$0		0112/0179	00	05/01/1965

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	
Replacement Cost Less Depreciation:	$0

Building Attributes

Field	Description
Style	Vacant Land
Model	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Elevator	
Fireplaces	
Sauna	
Spa/Jet Tub	
Whirlpool Tub	
Cath. Ceil	

Building Photo

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

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Building 2 : Section 1

Year Built: 1988
Living Area: 1,200
Replacement Cost: $62,291
Building Percent Good: 73
Replacement Cost Less Depreciation: $45,500

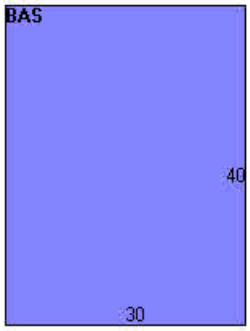
Building Attributes : Bldg 2 of 2	
Field	**Description**
STYLE	Service Shop
MODEL	Commercial
Grade	Below Average
Occupancy	1

Building Photo

(http://images.vgsi.com/photos/WiltonCTPhotos//\00\00\78/11.j

Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Enam Mtl Shing
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Dirt/None
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Type	None
Bldg Use	Ex Com MDL-96
Fireplace	
Elevator	
Cath Ceil	
Sauna	
1st Floor Use:	21I
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	None
Ceiling/Wall	Sus Ceil Min W
Rooms/Prtns	Average
Wall Height	11
% Comn Wall	0

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,200	1,200
		1,200	1,200

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	21V
Description	Ex Com MDL-00
Zone	R-2
Neighborhood	4000
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	74.12
Frontage	
Depth	
Assessed Value	$6,967,940
Appraised Value	$9,954,200

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$45,500	$9,954,200	$9,999,700
2014	$45,500	$9,954,200	$9,999,700
2013	$45,500	$9,954,200	$9,999,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$31,850	$6,967,940	$6,999,790
2014	$31,850	$6,967,940	$6,999,790
2013	$31,850	$6,967,940	$6,999,790

verizon

CROWN CASTLE

VERIZON SITE NAME:	WILTON CT
CROWN CASTLE SITE NAME:	BRG 124 943066
CROWN CASTLE BU NUMBER:	806353
SITE ADDRESS:	128 MATHER STREET WILTON, CT 06897
SITE TYPE:	SELF SUPPORT TOWER

SITE INFORMATION

APPLICANT:
CELLCO PARTERNSHIP D/B/A VERIZON WIRELESS
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

TOWER OWNER:
CROWN CASTLE

CROWN CASTLE PM:
WILLIAM GATES
(518) 373-3517

LATITUDE (NAD83):
41° 14' 18.34" N
41.238428

LONGITUDE (NAD83):
73° 25' 26.44" W
-73.424011

COUNTY:
FAIRFIELD

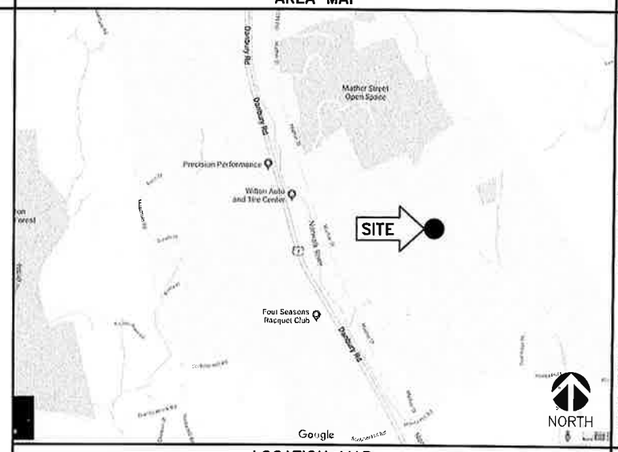
ZONING JURISDICTION:
TOWN OF WILTON

POWER COMPANY:
NATIONAL GRID
(800) 322-3223

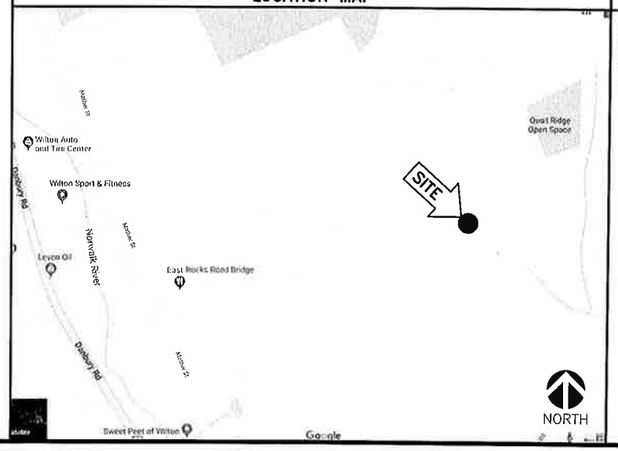
TELCO PROVIDER:
FIBER APP

VERIZON WIRELESS CM:
TBD

AREA MAP



LOCATION MAP



PROJECT DESCRIPTION

VERIZON PROPOSES TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATION FACILITY:

VERIZON EQUIPMENT TO BE REMOVED:

- REMOVE (3) EXISTING RRH'S

VERIZON EQUIPMENT TO BE INSTALLED:

- INSTALL (3) SAMSUNG RRH'S P/N: B2/B66A RRHBR049
- INSTALL (3) SAMSUNG RRH'S P/N: RRH 4T4R B5 160W
- INSTALL (3) STIFF ARM KITS (SITE PRO 1 PART# STK-U)
- RELOCATE (3) EXISTING STIFF ARM KITS

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY OWNED OR LEASED BY VERIZON IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY VERIZON. INFINIGY HAS INCORPORATED THIS SCOPE OF WORK IN THE PLANS. THESE PLANS ARE NOT FOR CONSTRUCTION UNLESS ACCOMPANIED BY A PASSING STRUCTURAL STABILITY ANALYSIS PREPARED BY A LICENSED STRUCTURAL ENGINEER. STRUCTURAL ANALYSIS MUST INCLUDE BOTH TOWER AND MOUNT.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. INTERNATIONAL BUILDING CODE (2015 IBC)
2. TIA-EIA-222-G OR LATEST EDITION
3. NFPA 780 – LIGHTNING PROTECTION CODE
4. 2017 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES, MOST RECENT EDITIONS
6. RI BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

811 Know what's below. Call before you dig. www.call811.com

DRAWING INDEX

SHEET NO:	SHEET TITLE	REV
T-1	TITLE SHEET & PROJECT DATA	0
SP-1	VERIZON SPECIFICATIONS	0
A-1	OVERALL SITE PLAN	0
A-2	TOWER ELEVATION	0
A-3	ANTENNA LAYOUT & LOADING CHART	0
A-4	EQUIPMENT DETAILS	0
A-5	EQUIPMENT DETAILS	0
G-1	GROUNDING PLAN & DETAILS	0

DRIVING DIRECTIONS

FROM: PROVIDENCE, RI
1. DEPART DORRANCE ST TOWARD FULTON ST / KENNEDY PLAZA
2. TURN LEFT ONTO WASHINGTON ST
3. TURN RIGHT ONTO UNION ST
4. TURN RIGHT ONTO US-1 N / FOUNTAIN ST
5. TURN LEFT TO STAY ON US-1 N / FOUNTAIN ST
6. TAKE RAMP LEFT FOR I-95 SOUTH TOWARD NEW YORK
7. AT EXIT 38, TAKE RAMP RIGHT FOR MILFORD PKWY TOWARD MERRITT AND W. CROSS PKWYS
8. TAKE RAMP LEFT FOR CT-15 SOUTH TOWARD N.Y. CITY
9. AT EXIT 41, TAKE RAMP RIGHT FOR CT-33 TOWARD WESTPORT / WILTON
10. TURN LEFT ONTO CT-33 / WILTON RD
11. TURN RIGHT ONTO HONEY HILL RD
12. TURN LEFT ONTO QUAIL RIDGE RD
13. ARRIVE AT 128 MATHER STREET, WILTON, CT 06897

PLANS PREPARED FOR:
verizon
180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-9636
JOB NUMBER: TBD

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
DEC 31 2018
No. 24705
LICENSED PROFESSIONAL ENGINEER

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME: WILTON CT

CROWN CASTLE SITE NAME: BRG 124 943066

CROWN CASTLE BU #: 806353

SITE ADDRESS: 128 MATHER STREET WILTON, CT 06897

SHEET DESCRIPTION: TITLE SHEET & PROJECT DATA

SHEET NUMBER: T-1

ELECTRICAL NOTES:

WORK INCLUDED

1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
   B. PROCURE ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH THE WORK OF THIS CONTRACT.
   C. SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS.
   D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION REQUIRED FOR THE WORK OF THIS CONTRACT. FOR SLAB PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK. COORDINATE ALL X-RAY WORK WITH BUILDING ENGINEER.
   E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL FRAMING SUPPORTS, AND BASES FOR CONDUIT AND EQUIPMENT PROVIDED OR INSTALLED UNDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND SEALS FOR FLOOR AND WALL PENETRATIONS.
   F. MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING ALL TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES, CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION PURPOSES.
2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS, IT IS CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT. FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

GENERAL REQUIREMENTS

1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL CODES.
2. THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY. REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING.
3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/DRAWINGS PROVIDED TO ENGINEERING. CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS PRIOR TO PURCHASING OF SPECIFIED EQUIPMENT FOR COMPLIANCE TO NEC. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY ENGINEER.
4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES. FUTURE EQUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.
5. GENERAL
   A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL, MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE, AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER, IN WRITING, OF ANY DISCREPANCIES THAT MAY HAVE BEEN NOTED BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND SPECIFICATIONS.
   B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME.
6. QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
   A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS, PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK.
   B. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
   C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE CONTRACT DOCUMENT OR NOT.
   D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.
   E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

GUARANTEE

1. GUARANTEE MATERIALS, PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT. DURING THAT PERIOD, MAKE GOOD FAULTS OR IMPERFECTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS DIRECTED BY ARCHITECT.

CLEANING

1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE WORK.
2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER.

COORDINATION AND SUPERVISION

1. CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER. RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES. ASSIST IN WORKING OUT SPACE CONDITIONS. IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CAUSES INTERFERENCE, MAKE CHANGES NECESSARY TO CORRECT CONDITIONS WITHOUT EXTRA CHARGE.

SUBMITTALS

1. AS-BUILT DRAWINGS:
   A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
2. SERVICE MANUALS:
   A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT VERIZON AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL, EQUIPMENT AND SYSTEMS.
   B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

CUTTING AND PATCHING

1. PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING REQUIRED TO COMPLETE THE WORK.
2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

TESTS, INSPECTION AND APPROVAL

1. BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS (TORQUE-TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL COMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE, OPERATIONAL CONDITION.
2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS, WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

SPECIAL REQUIREMENTS

1. DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS. DO NOT INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION.
2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON. SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN. ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

GROUNDING

1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON CONDUIT/GROUNDING RISER.
2. ROUTE 500 KCMIL CU. THHN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL. VERIFY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE GROUNDING ELECTRODE CONDUCTOR (GEC).
3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION TERMINATIONS, SIZED AS REQUIRED.
4. USE 1 HOLE, CRIMP TYPE, BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS.
5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

RACEWAYS

1. ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:
   A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND, TO BE IN SCH 40 PVC.
   B. EXTERIOR, ABOVE GROUND POWER CONDUITS TO BE GALVANIZED RIGID STEEL (RGS).
   C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO BE EMT.

   ON THIS PROJECT.
   E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "VERIZON". OWNER WILL PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
   F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL COMPRESSION FITTINGS.
   G. MINIMUM SIZE CONDUIT TO BE ¾" TRADE SIZE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
   H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID-TIGHT FLEXIBLE METAL CONDUIT.

   AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED.
   J. THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC. BEFORE INSTALLING ANY WORK, EXAMINE THE WORKING LAYOUTS AND SHOP DRAWINGS OF THE OTHER TRADES TO DETERMINE THE EXACT LOCATIONS AND CLEARANCES.
   K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

RACEWAYS CONT'D

   L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS, CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR CEILING.
   M. PROVIDE ALL CONDUIT ENDS WITH INSTULATED METALLIC GROUNDING BUSHINGS.
   N. CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF 8'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND VERTICAL DIRECTIONS.
   O. PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
   P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS, PER BUILDING.

WIRES AND CABLES

1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO BID.
2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR.
3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/THHN INSULATION, EXCEPT AS NOTED.
4. WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO. 12AWG. ALL WIRE NO. 8 AND LARGER TO BE STRANDED.
5. CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE. ALL CONTROL WIRE TO BE 600VOLT RATED.
6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED AND IS NOT TO BE RE-PULLED.
7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V CIRCUITS:

LENGTH (FT.)	HOME RUN WIRE SIZE
0 TO 50	NO. 12
51 TO 100	NO. 10
101 TO 150	NO. 8

8. VOLTAGE DROP IS NOT TO EXCEED 3%.
9. MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS, PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.

WIRING DEVICES

1. ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION.

DISCONNECT SWITCHES AND FUSES

1. DISCONNECT SWITCHES TO BE VOLTAGE-RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
3. PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION, NEMA 3R FOR EXTERIOR INSTALLATION.
4. DISCONNECT SWITCHES TO BE MANUFACTURED BY:
   A. GENERAL ELECTRIC COMPANY
   B. SQUARE-D
5. PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE.

INSTALLATION

1. INSTALL DISCONNECT SWITCHES WHERE INDICATED ON DRAWINGS.
2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES MUST MATCH IN TYPE AND RATING.
3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.
4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS FOLLOWS:
   A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60A, USED FOR INITIAL FUSING.
   B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE, UP TO AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED.

CONFLICTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE OWNER FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
2. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY MATTER OR THING CONCERNING SUCH BIDDER MIGHT HAVE FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING.
3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED, OR OF ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS GOVERNING THE WORK.

CONTRACTS AND WARRANTIES

1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.
2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR ADDITIONAL DETAILS.

STORAGE

1. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

CLEANUP

1. THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK. THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
2. EXTERIOR
   A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
3. INTERIOR
   A. VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
   B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
   C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM FINISHED SURFACES.

CHANGE ORDER PROCEDURE:

1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

RELATED DOCUMENTS AND COORDINATION

1. GENERAL CARPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED. IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR.

SHOP DRAWINGS

1. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR APPROVAL.
2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE OWNER.

PRODUCTS AND SUBSTITUTIONS

1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION. INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.
2. SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS, PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT SHEETS.

QUALITY ASSURANCE

1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

ADMINISTRATION

1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT. THIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. SUBMIT A BAR TYPE PROGRESS CHART, NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED FOR SUBSTANTIAL COMPLETION OF THE WORK.
3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF SUBCONTRACTED).
4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEEPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
5. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY REQUIREMENTS IN THEIR AGREEMENT.
6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE OWNER.
7. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.
8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

INSURANCE AND BONDS

1. CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER. REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.
2. THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES.
3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE.

GENERAL NOTES:

INTENT

1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN,INDICATED OR SPECIFIED IN BOTH
3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT.
4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.
5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A CHANGE ORDER.

ABBREVIATIONS	
ADJ	ADJUSTABLE
AGL	ABOVE GROUND LINE
&	AND
APPROX	APPROXIMATE
@	AT
BTS	BASE TRANSMISSION STATION
CAB	CABINET
CLG	CEILING
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR ø	DIAMETER
DWG	DRAWING
EA	EACH
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
EGB	EQUIPMENT GROUND BAR
(E)	EXISTING
EXT	EXTERIOR
FF	FINISHED FLOOR
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GRND	GROUND
LG	LONG
MAX	MAXIMUM
MECH	MECHANICAL
MW	MICROWAVE DISH
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTL	METAL
(N)	NEW
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
(P)	PROPOSED
PCS	PERSONAL COMMUNICATION SYSTEM
PPC	POWER PROTECTION CABINET
SF	SQUARE FOOT
SHT	SHEET
SIM	SIMILAR
SS	STAINLESS STEEL
STL	STEEL
TOC	TOP OF CONCRETE
TOM	TOP OF MASONRY
TYP	TYPICAL
VIF	VERIFY IN FIELD
UON	UNLESS OTHERWISE NOTED
WWF	WELDED WIRE FABRIC
W/	WITH

PLANS PREPARED FOR:

verizon

180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1490 W. 121st Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

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

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:

WILTON CT

CROWN CASTLE SITE NAME:

BRG 124 943066

CROWN CASTLE BU #:

806353

SITE ADDRESS:

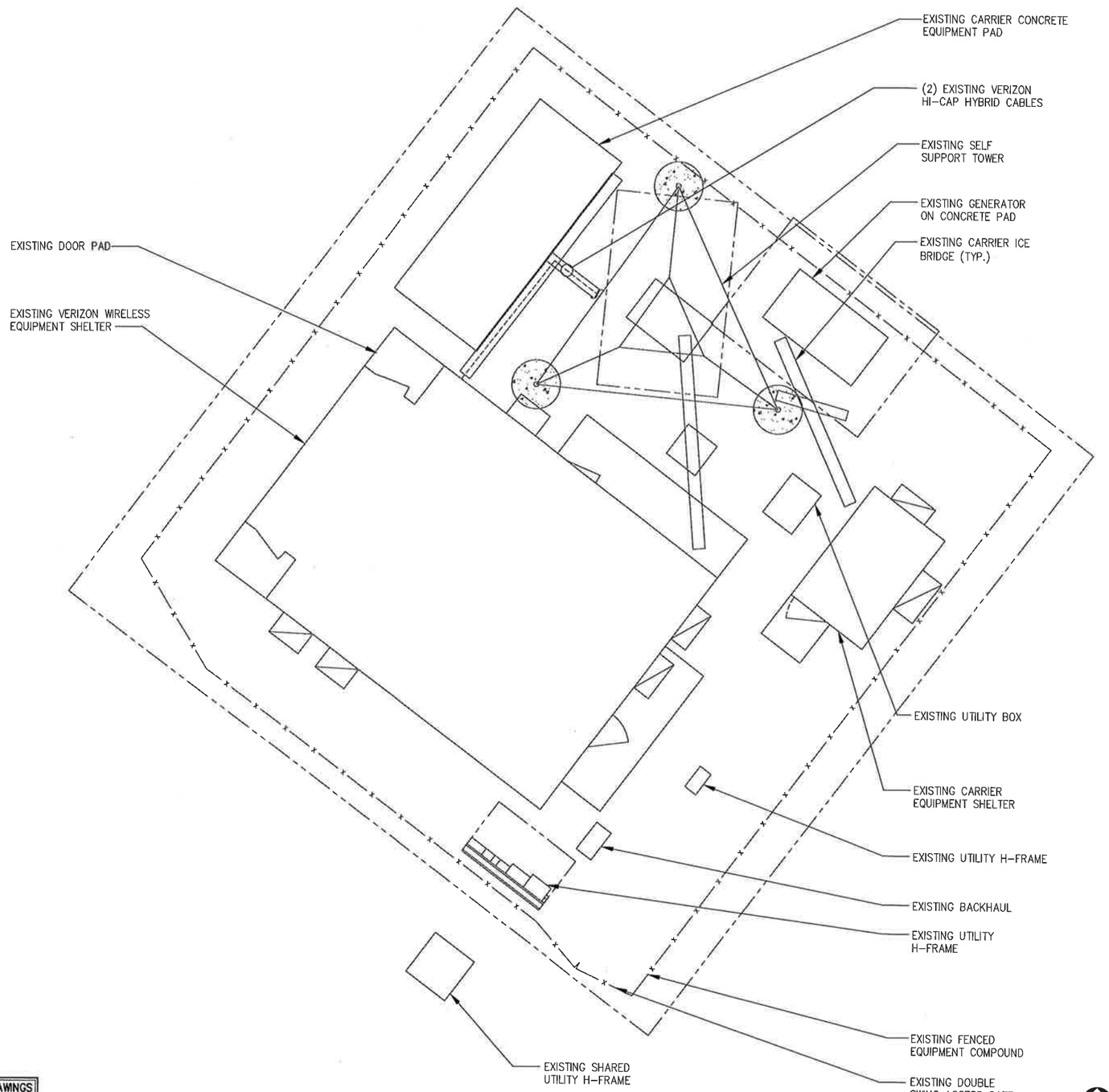
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:

VERIZON SPECIFICATIONS

SHEET NUMBER:

SP-1



INFORMATION CONTAINED WITHIN DRAWINGS IS BASED ON PROVIDED INFORMATION AND IS NOT THE RESULT OF A FIELD SURVEY. CONTRACTOR TO VERIFY EXISTING FIELD CONDITIONS PRIOR TO ANY CONSTRUCTION

GRAPHIC SCALE

10' 5' 0 5' 10'

NORTH

SCALE: 22"x34" SHEET 1"= 5'
SCALE: 11"x17" SHEET 1"= 10'

OVERALL SITE PLAN

SCALE: AS NOTED | 1

PLANS PREPARED FOR:

verizon

180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1176
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 21705
LICENSED PROFESSIONAL ENGINEER
DEC 18 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:

WILTON CT

CROWN CASTLE SITE NAME:

BRG 124 943066

CROWN CASTLE BU #:

806353

SITE ADDRESS:

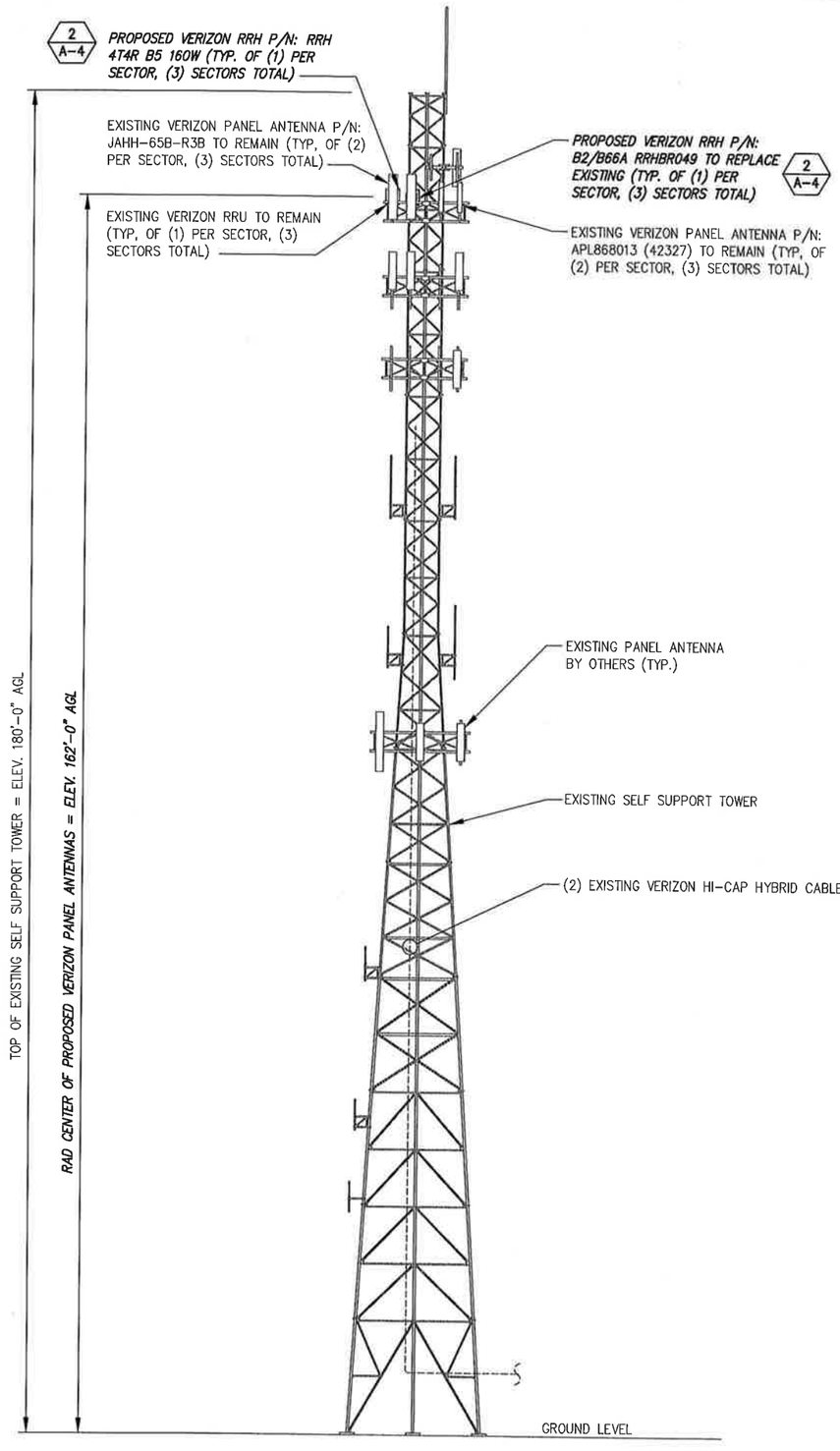
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:

OVERALL SITE PLAN

SHEET NUMBER:

A-1



PROPOSED TOWER ELEVATION

NO SCALE | 1

INFINIGY ENGINEERING HAS NOT EVALUATED THE TOWER OR MOUNT FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.

PLANS PREPARED FOR:

verizon

180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24706
LICENSED PROFESSIONAL ENGINEER
DEC 18 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:

WILTON CT

CROWN CASTLE SITE NAME:

BRG 124 943066

CROWN CASTLE BU #:

806353

SITE ADDRESS:

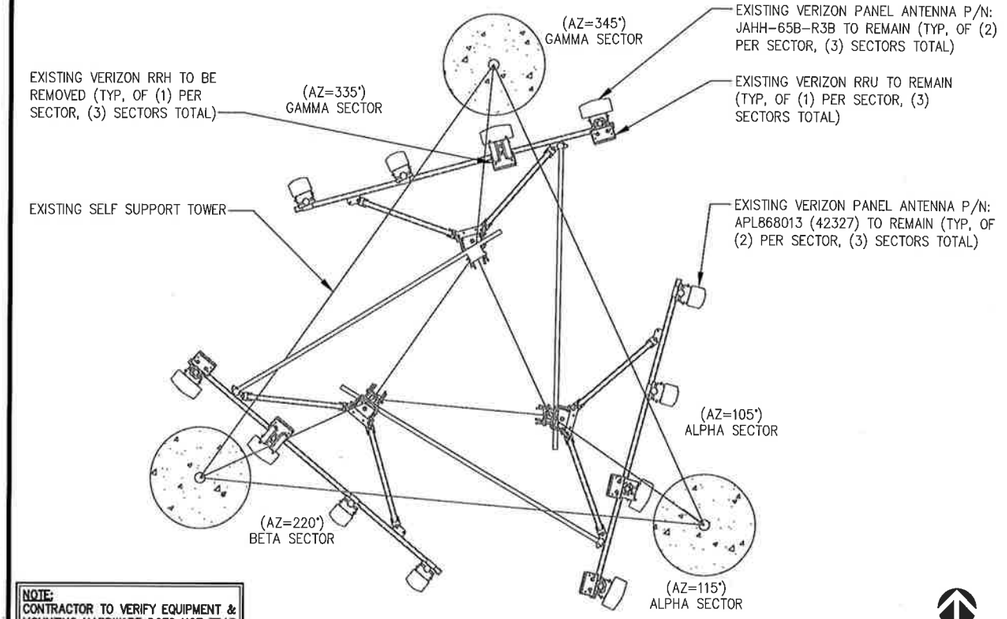
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:

TOWER ELEVATION

SHEET NUMBER:

A-2

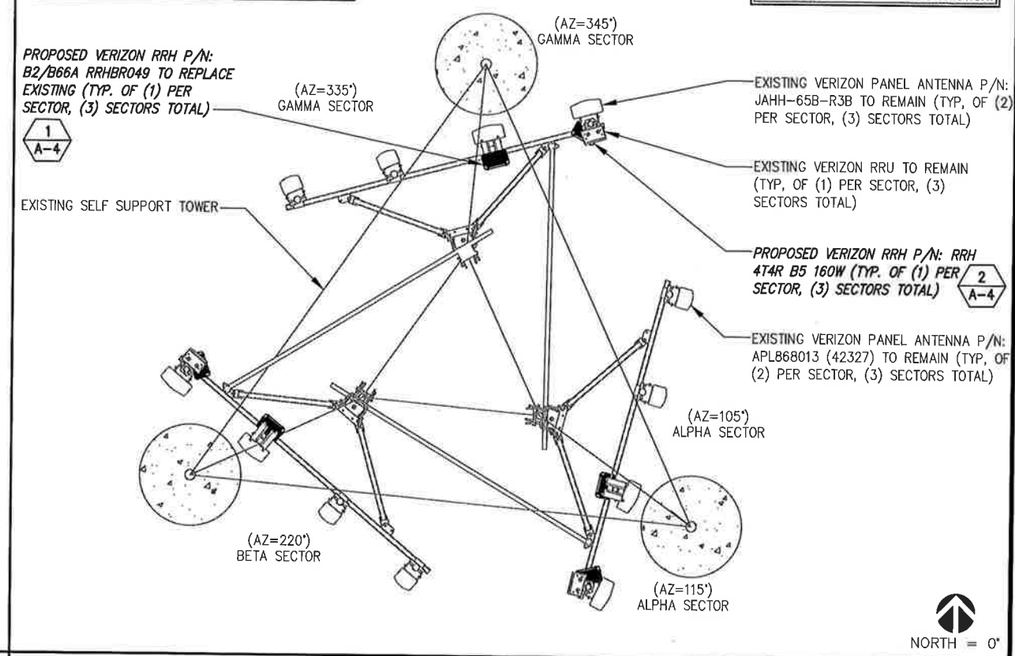


NOTE:
CONTRACTOR TO VERIFY EQUIPMENT & MOUNTING HARDWARE DOES NOT TRAP OR INTERFERE WITH SAFETY CLIMB

EXISTING ANTENNA LAYOUT | NO SCALE | 1

INFINIGY ENGINEERING HAS NOT EVALUATED THE TOWER OR MOUNT FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.

THE CONFIGURATION PLAN IS BASED ON PROVIDED INFORMATION AND IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS PRIOR TO CONSTRUCTION.



PROPOSED ANTENNA LAYOUT | NO SCALE | 2

SITE LOADING CHART

SECTOR	POSITION	SECTOR COLOR	TECHNOLOGY	ANTENNA MODEL #	VENDOR	QTY. (REMOVED)	QTY. (NEW)	RRH (QTY/MODEL)	AZIMUTH	DOWNTILT		RAD CENTER	FEED LINE TYPE/LENGTH (FEET + 20%)
										MECHANICAL	ELECTRICAL		
ALPHA	A1	RED	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	105°	0°	0°	±162' AGL	EXISTING COAX
ALPHA	A4	RED	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	105°	0°	0°	±162' AGL	EXISTING COAX
ALPHA	A2	RED	700 LTE/2100 LTE	JAHH-65B-R3B	ANDREW	--	--	***(1) B2/B66A RRHBR049***	115°	0°	1°	±162' AGL	(2) EXISTING HYBRID CABLE
ALPHA	A3	RED	1900 LTE/850 LTE	JAHH-65B-R3B	ANDREW	--	--	(1) UHBA B13 RRH 4x30/ ***(1) RRH 4T4R B5 160W***	115°	0°	6°	±162' AGL	HYBRID SHARED WITH ABOVE (ALPHA)
BETA	B1	BLUE	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	220°	0°	0°	±162' AGL	EXISTING COAX
BETA	B4	BLUE	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	220°	0°	0°	±162' AGL	EXISTING COAX
BETA	B2	BLUE	700 LTE/2100 LTE	JAHH-65B-R3B	ANDREW	--	--	***(1) B2/B66A RRHBR049***	220°	0°	1°	±162' AGL	HYBRID SHARED WITH ABOVE (ALPHA)
BETA	B3	BLUE	1900 LTE/850 LTE	JAHH-65B-R3B	ANDREW	--	--	(1) UHBA B13 RRH 4x30/ ***(1) RRH 4T4R B5 160W***	220°	3°	3°	±162' AGL	HYBRID SHARED WITH ABOVE (ALPHA)
GAMMA	G1	WHITE	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	335°	0°	0°	±162' AGL	EXISTING COAX
GAMMA	G4	WHITE	CDMA	APL868013 (42327)	RFS/CELWAVE	--	--	--	335°	0°	0°	±162' AGL	EXISTING COAX
GAMMA	G2	WHITE	700 LTE/2100 LTE	JAHH-65B-R3B	ANDREW	--	--	***(1) B2/B66A RRHBR049***	345°	0°	1°	±162' AGL	HYBRID SHARED WITH ABOVE (ALPHA)
GAMMA	G3	WHITE	1900 LTE/850 LTE	JAHH-65B-R3B	ANDREW	--	--	(1) UHBA B13 RRH 4x30/ ***(1) RRH 4T4R B5 160W***	345°	0°	5°	±162' AGL	HYBRID SHARED WITH ABOVE (ALPHA)

NOTE:
CABLE LENGTHS ARE BASED ON PROVIDED INFORMATION. CONTRACTOR TO VERIFY REQUIRED CABLE LENGTHS PRIOR TO CONSTRUCTION.

SITE LOADING CHART | NO SCALE | 3

PLANS PREPARED FOR:
verizon
180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1176
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
DEC 18 2018

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:
WILTON CT

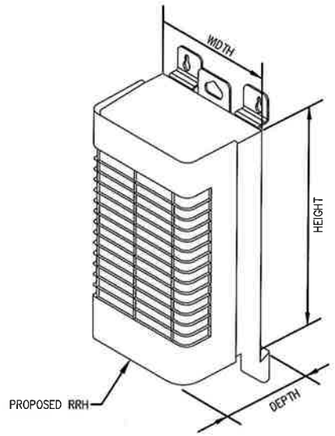
CROWN CASTLE SITE NAME:
BRG 124 943066

CROWN CASTLE BU #:
806353

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

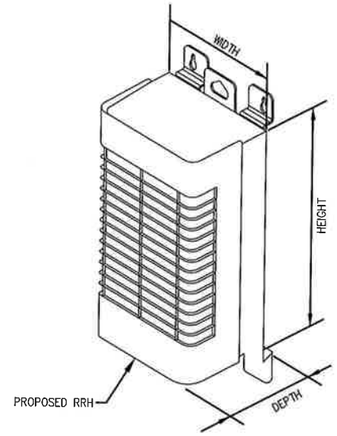
SHEET DESCRIPTION:
ANTENNA LAYOUT & LOADING CHART

SHEET NUMBER:
A-3



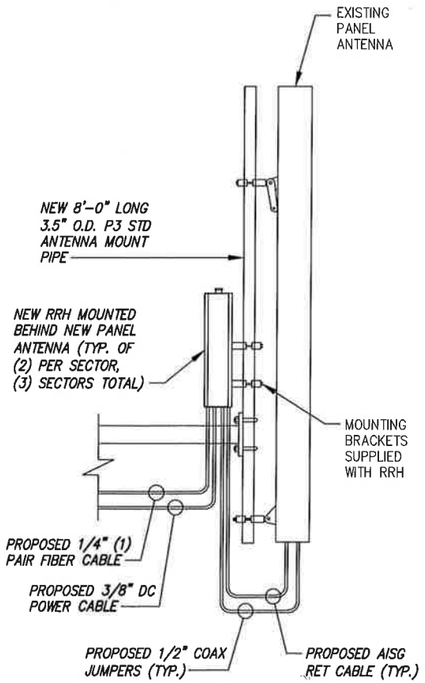
SIZE AND WEIGHT TABLE				
RRH	WIDTH	DEPTH	HEIGHT	WEIGHT WO BRACKET
B2/B66A RRHBR049	11.9"	7.2"	25.8"	52.9 LBS

REMOTE RADIO HEAD SPECIFICATIONS | NO SCALE | 1

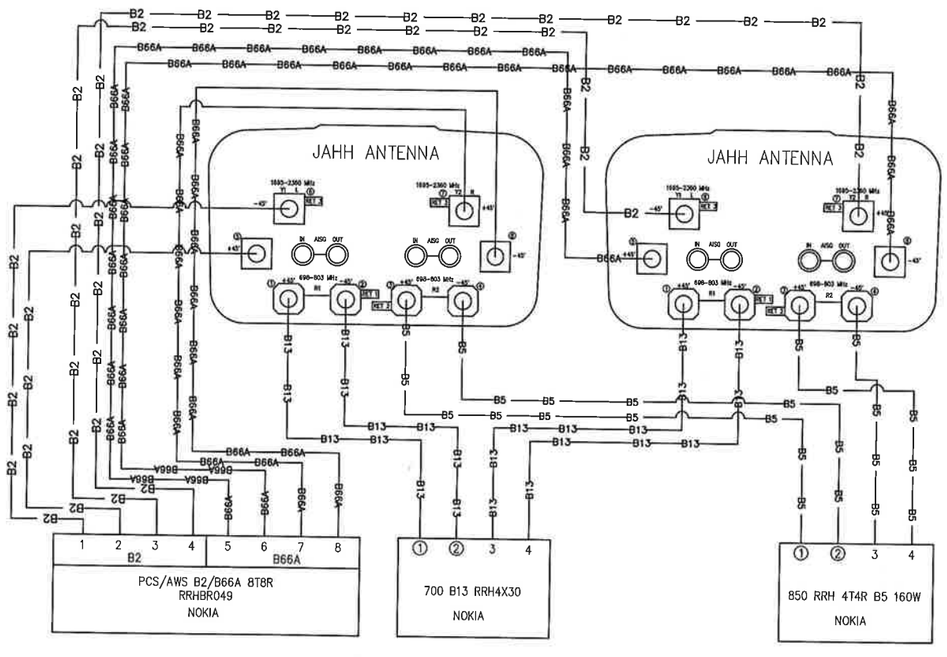


SIZE AND WEIGHT TABLE				
RRH	WIDTH	DEPTH	HEIGHT	WEIGHT WO BRACKET
RRH 4T4R B5 160W	12.0"	9.0"	21.6"	57.2 LBS

REMOTE RADIO HEAD SPECIFICATIONS | NO SCALE | 2



RRH MOUNTING DETAIL | NO SCALE | 3



WIRING DIAGRAM | NO SCALE | 4

PLANS PREPARED FOR:

verizon

180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:

INFINIGY

FROM ZERO TO INFINIGY
the solutions are endless

1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
DEC 19 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:

WILTON CT

CROWN CASTLE SITE NAME:

BRG 124 943066

CROWN CASTLE BU #:

806353

SITE ADDRESS:

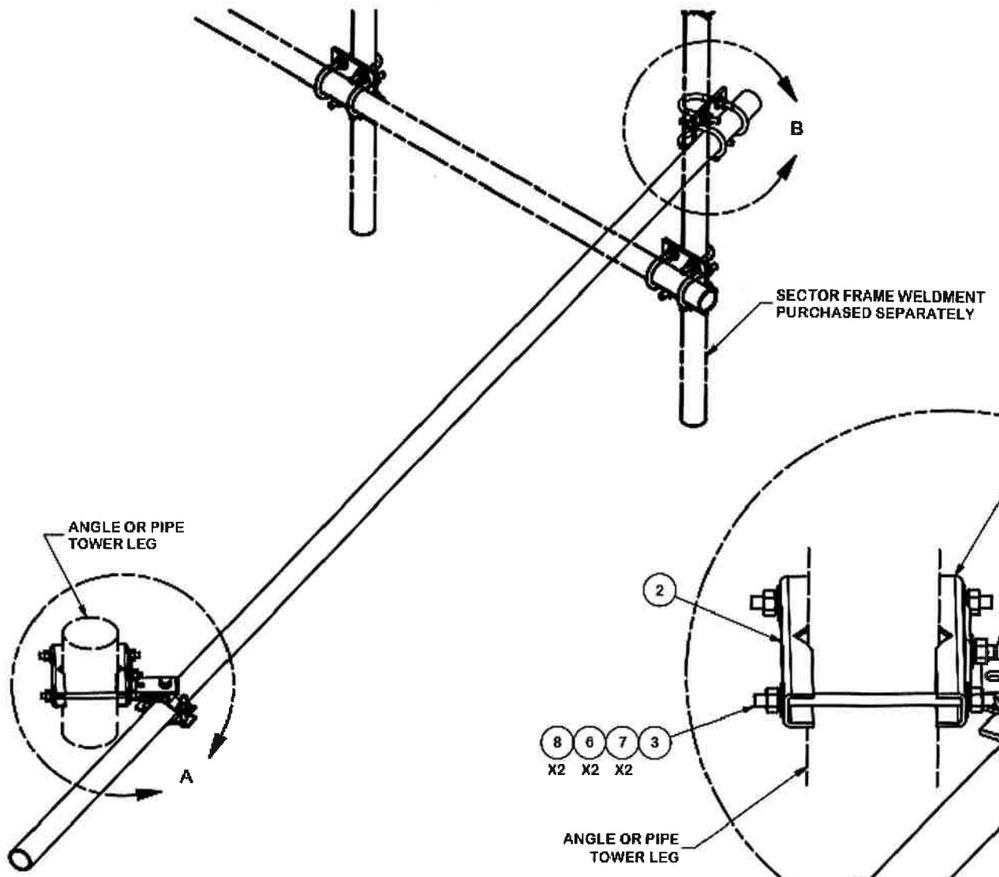
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:

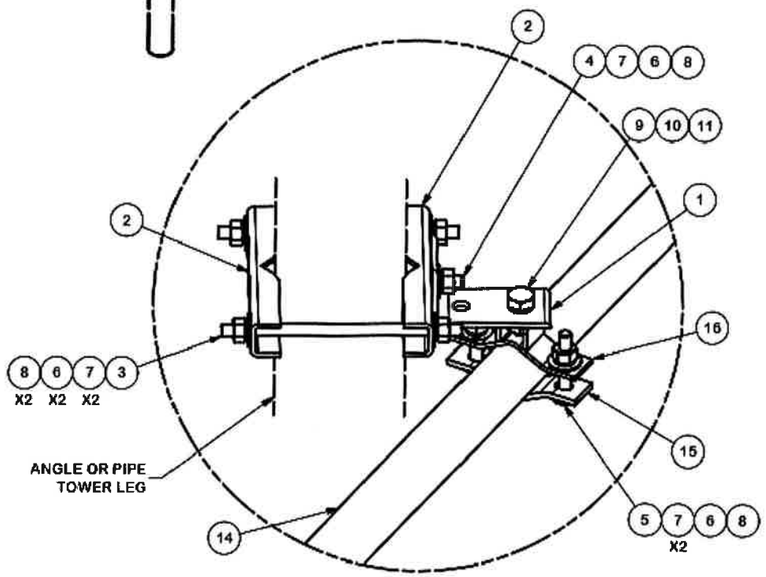
EQUIPMENT & DETAILS

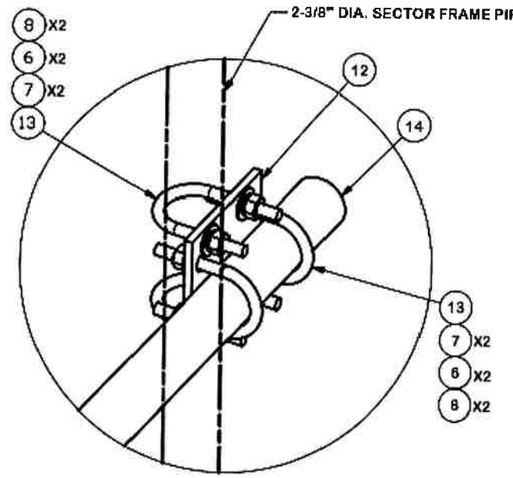
SHEET NUMBER:

A-4



DETAIL A





DETAIL B

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-STA3	STIFF ARM ANGLE BRACKET	2 1/2 in	1.39	1.39
2	2	X-STU	STIFF ARM CHANNEL BRACKET		1.37	2.74
3	2	G12R-10	1/2" x 10" THREADED ROD (HDG.)		3.23	6.45
4	1	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1 1/2 in	0.15	0.15
5	2	G1203	1/2" x 3" HDG HEX BOLT GR5 FULL THREAD	3 in	0.22	0.43
6	15	G12LW	1/2" HDG LOCKWASHER		0.01	0.21
7	17	G12FW	1/2" HDG USS FLATWASHER		0.03	0.58
8	15	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.07
9	1	G58112	5/8" x 1-1/2" HDG BOLT	1 1/2 in	0.25	0.25
10	1	G58LW	5/8" HDG LOCKWASHER		0.03	0.03
11	1	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.13
12	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
13	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.66	2.63
14	1	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	48.06
15	1	ACP	4-1/16" CLAMP HALF, 1/4" THK.		0.65	0.65
16	1	SAM	STIFF ARM MOUNT CLAMP		0.77	0.77
					TOTAL WT. #	63.79

STIFF ARM DETAIL (SITE PRO 1 PART# STK-U)

NO SCALE | 1

PLANS PREPARED FOR:

verizon

160 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:

CROWN CASTLE

ENGINEERING LICENSE:

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
DEC 18 2018

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:

WILTON CT

CROWN CASTLE SITE NAME:

BRG 124 943066

CROWN CASTLE BU #:

806353

SITE ADDRESS:

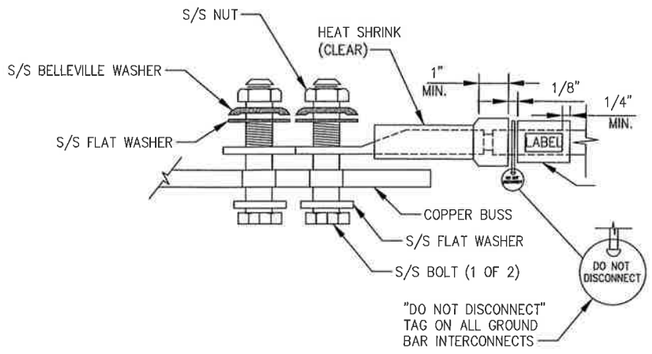
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:

EQUIPMENT
DETAILS

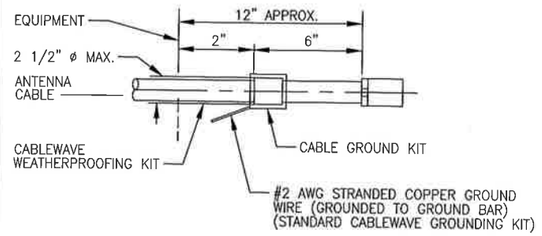
SHEET NUMBER:

A-5



NOTE:
ALL MECHANICAL EXTERNAL TERMINATION SURFACES SHALL BE TREATED WITH T&B KOPR-SHIELD CP8 ANTI-OXIDATION COMPOUND.

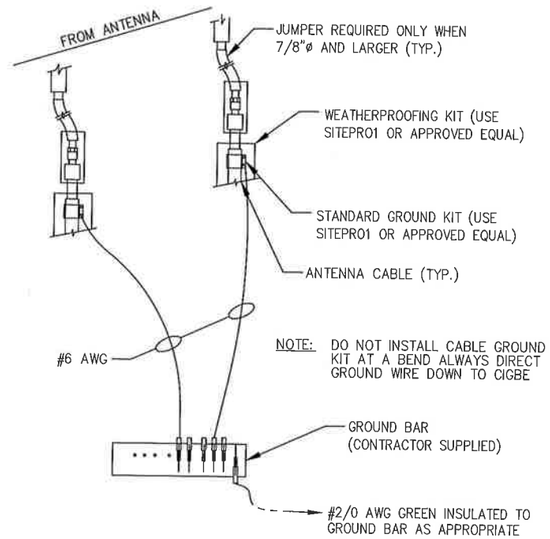
TYPICAL EQUIPMENT GROUND CONNECTION | NO SCALE | 1



TO ANTENNA CABLE

NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

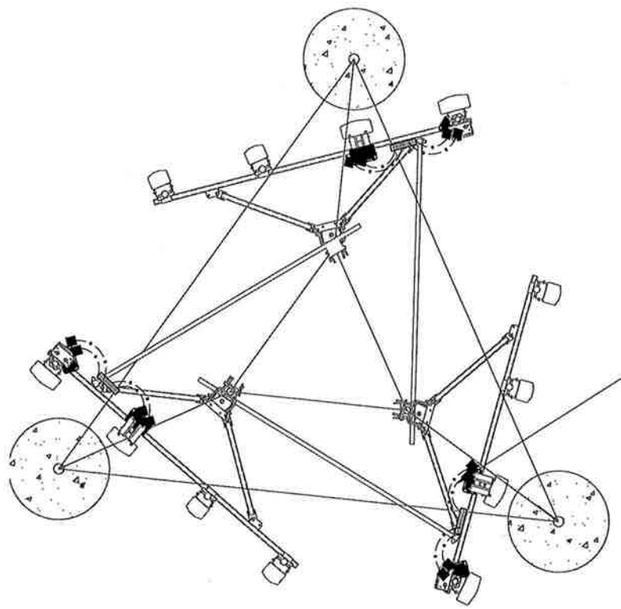
TYPICAL CABLE GROUND KIT CONNECTION | NO SCALE | 2



TYPICAL CONNECTION OF GROUND WIRES TO GROUNDING BARS @ ANTENNAS | NO SCALE | 3

GENERAL GROUNDING NOTES:

1. TO ENSURE PROPER BONDING, ALL CONNECTIONS SHALL BE AS FOLLOWS:
   – #2 BARE TINNED SOLID COPPER CONDUCTOR: EXOTHERMIC WELD TO RODS OR GROUND RING
   – LUGS AND BUS BAR (UNLESS NOTED OTHERWISE): SANDED CLEAN, COATED WITH OXIDE INHIBITOR AND BOLTED FOR MAXIMUM SURFACE CONTACT. ALL LUGS SHALL BE COPPER (NO ALUMINUM SHALL BE PERMITTED). PROVIDE LOCK WASHERS FOR ALL MECHANICAL CONNECTIONS FOR GROUND CONDUCTORS. USE STAINLESS STEEL HARDWARE THROUGHOUT.
2. ALL GROUNDING CABLE IN CONCRETE OR THROUGH WALLS SHALL BE IN 3/4" PVC CONDUIT. SEAL AROUND CONDUIT THROUGH WALLS. NO METALLIC CONDUIT SHALL BE USED FOR GROUNDING CONDUCTORS.
3. OWNER'S REPRESENTATIVE WILL INSPECT EXOTHERMIC WELD AND CONDUCT MEGGER TEST PRIOR TO BURIAL. MAXIMUM 5 OHMS RESISTANCE IS REQUIRED.
4. CONTRACTOR TO INSTALL GROUNDING IN CLOSE PROXIMITY TO EQUIPMENT PLATFORM OR PAD.
5. MAKE ALL GROUND CONNECTIONS AS SHORT AND DIRECT AS POSSIBLE. AVOID SHARP BENDS. ALL BENDS SHALL BE A MINIMUM 8" RADIUS AND NO GREATER THAN 90 DEGREES.
6. ALL CADWELDS TO BURIED GROUND RING SHALL BE THE PARALLEL TYPE, EXCEPT FOR THE GROUND RODS WHICH SHALL BE THE TEE TYPE.
7. BOND SERVICE CONDUITS TO GROUND RING AS THEY CROSS. DO NOT EXOTHERMICALLY WELD TO CONDUITS.
8. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER WHEN THE GROUNDING SYSTEM IS COMPLETE. THE CONSTRUCTION MANAGER SHALL INSPECT THE GROUNDING SYSTEM PRIOR TO BACKFILLING.
9. THE MINIMUM SPACING BETWEEN GROUND RODS SHALL BE 10'-0" (MAX. 15'-0").
10. BOND CIGBE TO EXTERNAL GROUND RING WITH 2 RUNS OF #2 BARE, TINNED, SOLID COPPER CONDUCTOR IN PVC. CONNECT BAR END WITH 2 HOLE LUG, AND "CADWELD" THE OTHER END TO THE EXTERNAL GROUND ROD.
11. THE PREFERRED LOCATION FOR COAX GROUNDING IS AT THE BASE OF THE TOWER PRIOR TO THE COAX BEND.
12. BONDING OF THE GROUNDED CONDUCTOR (NEUTRAL) AND THE GROUNDING CONDUCTOR SHALL BE AT THE SERVICE DISCONNECTING MEANS. BONDING JUMPER SHALL BE INSTALLED PER N.E.C. ARTICLE 250-30.



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 1

GROUNDING SYMBOLS:

⊗	GROUND ROD
□	ACCESS WELL
⊠	GROUND ROD WITH ACCESS
■	COMPRESSION TYPE CONNECTION
●	EXOTHERMIC WELD TYPE CONNECTION
—G—	#2/0 BTS COPPER CONDUCTOR BURIED GROUND CABLE
⬠ (#)	INDICATES CODED NOTE

NORTH = 0°

PLANS PREPARED FOR:
verizon
180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

PLANS PREPARED BY:
INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
1490 W. 121st. Ave., Suite 101
Westminster, CO 80234
Office # (303) 219-1178
Fax # (303) 242-8636
JOB NUMBER: TBD

MLA PARTNER:
CROWN CASTLE

ENGINEERING LICENSE:
STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER
DATE: 1-8-2019

DRAWING NOTICE:

REVISIONS:

DESCRIPTION	DATE	BY	REV
ISSUED FOR CONSTRUCTION	12/18/18	RCD	0
ISSUED FOR REVIEW	11/28/18	RCD	A

VERIZON SITE NAME:
WILTON CT

CROWN CASTLE SITE NAME:
BRG 124 943066

CROWN CASTLE BU #:
806353

SITE ADDRESS:
128 MATHER STREET
WILTON, CT 06897

SHEET DESCRIPTION:
GROUNDING PLANS

SHEET NUMBER:
G-1

PAUL J. FORD & COMPANY

Date: **October 08, 2018**

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

Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
(614) 221-6679

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	1976
	Carrier Site Name:	WILTON CT
Crown Castle Designation:	**Crown Castle BU Number:**	806353
	Crown Castle Site Name:	BRG 124 943066
	Crown Castle JDE Job Number:	535165
	Crown Castle Work Order Number:	1641659
	Crown Castle Order Number:	461645 Rev. 3
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37518-3356.001.8700
Site Data:	**128 MATHER STREET, WILTON, Fairfield County, CT** **Latitude *41° 14' 18.34"*, Longitude *-73° 25' 26.44"*** **180 Foot - Self Support Tower**	

Dear Denice Nicholson,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2016 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Michael T Bange

Michael Bange, EI
Structural Designer
mbange@pauljford.com

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

OCT 0 8 2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by FWT INC..

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 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)
164.0	166.0	3	alcatel lucent	B13 RRH 4X30	14	1-5/8
		6	commscope	JAHH-65B-R3B w/ Mount Pipe		
		3	nokia	B5 4T4R RRH4X40 AIRSCALE		
		6	rfs celwave	APL868013-42T0 w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		6	rfs celwave	FD9R6004/2C-3L		
		3	samsung telecommunications	RFV01U-D2A		
	164.0	1	tower mounts	Sector Mount [SM 702-3]		
62.0	65.0	1	gps	GPS_A	1	1/2
	62.0	1	tower mounts	Side Arm Mount [SO 301-1]		

Table 2 – Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	184.0	1	rfs celwave	PD10017	2	7/8
170.0	171.0	3	kathrein	800 10504 w/ Mount Pipe	1 6	1/4 1-5/8
	170.0	3	kathrein	860 10025		
		1	tower mounts	Side Arm Mount [SO 103-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
154.0	158.0	6	ericsson	RRUS 11	12 2 4	1-5/8 3/8 5/8
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	kaelus	DBC0061F1V51-2		
		6	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		3	powerwave technologies	P65-16-XLH-RR w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
		3	quintel technology	QS66512-2 w/ Mount Pipe		
		1	raycap	DC6-48-60-18-8F		
	154.0	1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Sector Mount [SM 602-3]		
146.0	146.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-
		3	alcatel lucent	800MHZ 2X50W RRH		
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
143.0	143.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4
		9	rfs celwave	ACU-A20-N		
		3	rfs celwave	APXVSPP18-C-A20		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 701-3]		
124.0	131.0	2	rfs celwave	1142-2C	2	1/2
	124.0	2	tower mounts	Side Arm Mount [SO 306-1]		
104.0	111.0	1	rfs celwave	1142-2C	1 1	1/2 7/8
	108.0	1	rfs celwave	220-3BN		
	104.0	2	tower mounts	Side Arm Mount [SO 306-1]		
93.0	93.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-1/4
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RRUS 11 B12		
		1	tower mounts	Sector Mount [SM 1306-3]		
42.0	44.0	1	gps	GPS_A	1	1/2
	42.0	1	tower mounts	Side Arm Mount [SO 301-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
31.0	32.0	1	gps	GPS_A	1	1/2
	31.0	1	tower mounts	Side Arm Mount [SO 301-1]		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	FDH, 09-04219E G1 - 4/29/2009	262283	CCISITES
POST-MODIFICATION INSPECTION	Paul J. Ford, 37509-0801 - 1/11/2010	2575710	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, 18888-81 - 5/31/1988	262285	CCISITES
TOWER MANUFACTURER DRAWINGS	FWT, 18888-81 - 5/6/1988	217757	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford, 37509-0801 - 12/8/2009	2434484	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	HEB, 98124A - 1/7/2000	3290324	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	APT, CT105271 - 1/17/2003	801524	CCISITES
FOUNDATION MAPPING	FDH, 09-11077 E N1 - 8/7/2012	3290324	CCISITES
POST-MODIFICATION INSPECTION	SGS, 163898, 10/21/2016	6515894	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) The existing base plate grout was considered in this analysis. Grout must be maintained and inspected periodically, and must be replaced if damaged or cracked. Refer to crown document PRC-10012, Base Plate Grout Inspection & Classification.
4) The Knife plates at 40' and 20' splices have not been analyzed since the existing flange bolts do pass in this analysis.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Self Support Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 168	Leg	Pipe 2.375" x 0.154" (2 STD)	1	-2.24	29.38	7.6	Pass
T2	168 - 160	Leg	Pipe 2.375" x 0.154" (2 STD) (GR)	26	-10.61	40.35	26.3	Pass
T3	160 - 140	Leg	Pipe 3.5" x 0.216" (3 STD) (GR)	41	40.68	73.71	55.2	Pass
T4	140 - 120	Leg	Pipe 4" x 0.318" (3.5 XS) (GR)	68	-86.31	128.24	67.3	Pass
T5	120 - 100	Leg	Pipe 4.5" x 0.337" (4 XS) (GR)	89	-119.01	165.05	72.1 81.7 (b)	Pass
T6	100 - 80	Leg	Pipe 5.563" x 0.375" (5 XS) (GR)	110	131.59	202.15	65.1 75.4 (b)	Pass
T7	80 - 60	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	131	158.27	277.99	56.9	Pass
T8	60 - 40	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	146	185.47	277.99	66.7 81.0 (b)	Pass
T9	40 - 20	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	161	210.58	277.99	75.7	Pass
T10	20 - 0	Leg	Pipe 8.625" x 0.500" (8 XS) (GR)	182	234.82	422.13	55.6	Pass
T1	180 - 168	Diagonal	L 2 x 1.5 x 3/16 LLV	11	-0.61	17.33	3.5 7.6 (b)	Pass
T2	168 - 160	Diagonal	L 2 x 1.5 x 3/16 LLV	29	2.53	16.46	15.3 33.8 (b)	Pass
T3	160 - 140	Diagonal	L 2 x 1.5 x 3/16 LLV	43	-4.34	12.46	34.9 57.3 (b)	Pass
T4	140 - 120	Diagonal	L 2 x 2 x 3/16	70	-4.97	10.92	45.5 68.9 (b)	Pass
T5	120 - 100	Diagonal	L 2.5 x 2 x 3/16 LLV	92	-5.20	10.62	49.0 49.6 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	112	-6.54	11.89	55.0 63.1 (b)	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	133	-7.85	12.89	60.9 67.7 (b)	Pass
T8	60 - 40	Diagonal	L 3.5 x 3 x 1/4 LLV	148	-8.41	17.00	49.5 58.0 (b)	Pass
T9	40 - 20	Diagonal	L 3.5 x 3 x 1/4 LLV	163	-9.72	13.69	71.0	Pass
T10	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	184	-10.05	15.76	63.8 69.3 (b)	Pass
T9	40 - 20	Secondary Horizontal	L 3.5 x 3.5 x 1/4	169	-4.32	23.70	18.2 46.6 (b)	Pass
T1	180 - 168	Top Girt	L 2 x 1.5 x 3/16 LLH	5	-0.13	10.65	1.2 2.8 (b)	Pass
							Summary	
						Leg (T5)	81.7	Pass
						Diagonal (T9)	71.0	Pass
						Secondary Horizontal (T9)	46.6	Pass
						Top Girt (T1)	2.8	Pass
						Bolt Checks	81.7	Pass
						Rating =	81.7	Pass

Table 5 - Tower Component Stresses vs. Capacity (Self Support Tower) – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	100.0	Pass
1	Base Foundation Structural	0	39.4	Pass
1	Base Foundation Soil Interaction	0	86.8	Pass

Structure Rating (max from all components) =	100.0%

Notes:

- All structural ratings per TIA-222-H Section 15.5

1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation(s) have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

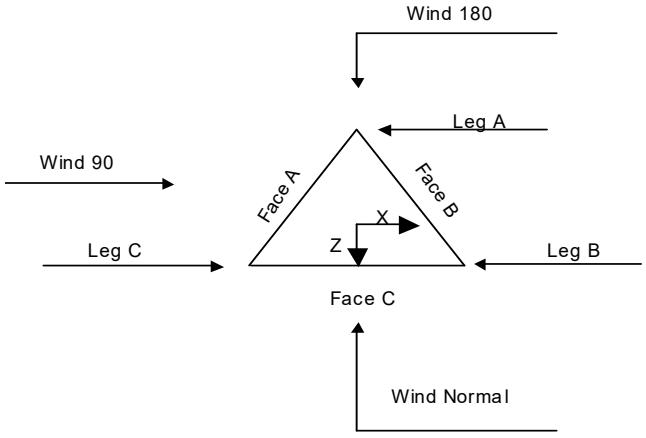
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 20.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in Fairfield County, Connecticut.
2) Tower base elevation above sea level: 426.00 ft.
3) Basic wind speed of 120 mph.
4) Risk Category II.
5) Exposure Category B.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height 0.00 ft.
9) Nominal ice thickness of 1.27 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Deflections calculated using a wind speed of 60 mph.
14) see additional calcs for flange capacity at 60' and 20', considering the weakest link weld in the jump plate design.
15) TIA-222-H Annex S.
16) Grouted pipe f'_c is 7 ksi.
17) Pressures are calculated at each section.
18) Stress ratio used in tower member design is 1.05.
19) 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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180.00-168.00			4.00	1	12.00
T2	168.00-160.00			4.00	1	8.00
T3	160.00-140.00			4.00	1	20.00
T4	140.00-120.00			6.00	1	20.00
T5	120.00-100.00			8.00	1	20.00
T6	100.00-80.00			10.00	1	20.00
T7	80.00-60.00			12.00	1	20.00
T8	60.00-40.00			14.00	1	20.00
T9	40.00-20.00			16.00	1	20.00
T10	20.00-0.00			18.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180.00-168.00	4.00	X Brace	No	No	0.00	0.00
T2	168.00-160.00	4.00	X Brace	No	No	0.00	0.00
T3	160.00-140.00	5.00	X Brace	No	No	0.00	0.00
T4	140.00-120.00	6.67	X Brace	No	No	0.00	0.00
T5	120.00-100.00	6.67	X Brace	No	No	0.00	0.00
T6	100.00-80.00	6.67	X Brace	No	No	0.00	0.00
T7	80.00-60.00	10.00	X Brace	No	No	0.00	0.00
T8	60.00-40.00	10.00	X Brace	No	No	0.00	0.00
T9	40.00-20.00	10.00	X Brace	No	Yes	0.00	0.00
T10	20.00-0.00	10.00	X Brace	No	No	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180.00-168.00	Pipe	Pipe 2.375" x 0.154" (2 STD)	A53-B-35 (35 ksi)	Single Angle	L 2 x 1.5 x 3/16 LLV	A36 (36 ksi)
T2 168.00-160.00	Grouted Pipe	Pipe 2.375" x 0.154" (2 STD)	A53-B-35 (35 ksi)	Single Angle	L 2 x 1.5 x 3/16 LLV	A36 (36 ksi)
T3 160.00-140.00	Grouted Pipe	Pipe 3.5" x 0.216" (3 STD)	A53-B-35 (35 ksi)	Single Angle	L 2 x 1.5 x 3/16 LLV	A36 (36 ksi)
T4 140.00-120.00	Grouted Pipe	Pipe 4" x 0.318" (3.5 XS)	A53-B-35 (35 ksi)	Single Angle	L 2 x 2 x 3/16	A36 (36 ksi)
T5 120.00-100.00	Grouted Pipe	Pipe 4.5" x 0.337" (4 XS)	A53-B-35 (35 ksi)	Single Angle	L 2.5 x 2 x 3/16 LLV	A36 (36 ksi)
T6 100.00-80.00	Grouted Pipe	Pipe 5.563" x 0.375" (5 XS)	A53-B-35 (35 ksi)	Single Angle	L 2.5 x 2.5 x 3/16	A36 (36 ksi)
T7 80.00-60.00	Grouted Pipe	Pipe 6.625" x 0.432" (6 XS)	A53-B-35 (35 ksi)	Single Angle	L 3 x 3 x 3/16	A36 (36 ksi)
T8 60.00-40.00	Grouted Pipe	Pipe 6.625" x 0.432" (6 XS)	A53-B-35 (35 ksi)	Single Angle	L 3.5 x 3 x 1/4 LLV	A36 (36 ksi)
T9 40.00-20.00	Grouted Pipe	Pipe 6.625" x 0.432" (6 XS)	A53-B-35 (35 ksi)	Single Angle	L 3.5 x 3 x 1/4 LLV	A36 (36 ksi)
T10 20.00-0.00	Grouted Pipe	Pipe 8.625" x 0.500" (8 XS)	A53-B-35 (35 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180.00-168.00	Single Angle	L 2 x 1.5 x 3/16 LLH	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T9 40.00-20.00	Single Angle	L 3.5 x 3.5 x 1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 180.00-168.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T2 168.00-160.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T3 160.00-140.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00

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
T4 140.00-120.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T5 120.00-100.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T6 100.00-80.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T7 80.00-60.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T8 60.00-40.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T9 40.00-20.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00
T10 20.00-0.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.15	0.00	0.00	36.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 180.00-168.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 168.00-160.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 160.00-140.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 140.00-120.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 120.00-100.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 100.00-80.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.00-60.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.00-40.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.00-20.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 0.5	1 1
T10 20.00-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 180.00-168.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T2 168.00-160.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T3 160.00-140.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T4 140.00-120.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 120.00-100.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 100.00-80.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 80.00-60.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 60.00-40.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 40.00-20.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 20.00-0.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top in	Horiz. Top in	Vert. Bot. in	Horiz. Bot. in	Vert. Top in	Horiz. Top in	Vert. Bot. in	Horiz. Bot. in
T1 180.00-168.00	4.50	4.19	4.50	4.19	0.00	0.00	0.00	0.00
T2 168.00-160.00	4.50	4.19	4.50	4.19	0.00	0.00	0.00	0.00
T3 160.00-140.00	4.60	4.75	4.60	4.75	0.00	0.00	0.00	0.00
T4 140.00-120.00	4.50	5.00	4.00	5.00	0.00	0.00	0.00	0.00
T5 120.00-100.00	3.50	5.25	3.50	5.25	0.00	0.00	0.00	0.00
T6 100.00-80.00	2.50	5.78	2.50	5.78	0.00	0.00	0.00	0.00
T7 80.00-60.00	4.00	6.31	4.00	6.31	0.00	0.00	0.00	0.00
T8 60.00-40.00	4.00	6.31	4.00	6.31	0.00	0.00	0.00	0.00
T9 40.00-20.00	3.90	6.31	3.90	6.31	0.00	0.00	0.00	0.00
T10 20.00-0.00	4.00	7.31	4.00	7.31	0.00	0.00	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180.00-168.00	Flange	0.00 A325N	0	0.63 A325N	1	0.63 A325N	1	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T2 168.00-160.00	Flange	0.63 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T3 160.00-140.00	Flange	0.63 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T4 140.00-120.00	Flange	0.75 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T5 120.00-100.00	Flange	0.75 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T6 100.00-80.00	Flange	0.88 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T7 80.00-60.00	Flange	0.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T8 60.00-40.00	Flange	1.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0
T9 40.00-20.00	Flange	0.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.50 A325N	1
T10 20.00-0.00	Flange	0.00 F1554-36	0	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.63 A325N	0	0.00 A325N	0	0.00 A325N	0

Grouted Pipe Properties

Size	F_y ksi	A_s in^2	A_c in^2	Wt plf	E_c ksi	E_m ksi	F_{ym} ksi
Pipe 2.375" x 0.154" (2 STD) (GR)	35	1.07	3.36	10.65	4769	40914	54
Pipe 3.5" x 0.216" (3 STD) (GR)	35	2.23	7.39	22.98	4769	41656	55
Pipe 4" x 0.318" (3.5 XS) (GR)	35	3.68	8.89	31.03	4769	38218	49
Pipe 4.5" x 0.337" (4 XS) (GR)	35	4.41	11.50	38.95	4769	38952	51
Pipe 5.563" x 0.375" (5 XS) (GR)	35	6.11	18.19	58.70	4769	40357	53
Pipe 6.625" x 0.432" (6 XS) (GR)	35	8.40	26.07	82.91	4769	40832	53
Pipe 8.625" x 0.500" (8 XS) (GR)	35	12.76	45.66	138.56	4769	42650	56

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1.5" flat Climb Ladder Rail	C	No	No	Af (CaAa)	180.00 - 0.00	0.00	0	2	2	12.00 1.50	1.50		1.80
5/8" ladder rung (12" long 12" oc)	C	No	No	Ar (CaAa)	180.00 - 0.00	0.00	0	1	1	0.63	0.63		1.04
Safety Line 3/8 ***	C	No	No	Ar (CaAa)	180.00 - 0.00	3.00	0	1	1	0.38	0.38		0.22
FSJ4-50B(1/2")	A	No	No	Ar (CaAa)	42.00 - 0.00	0.00	-0.1	4	4	0.52	0.52		0.14
LDF4-50A(1/2")	A	No	No	Ar (CaAa)	62.00 - 42.00	0.00	-0.1	3	3	0.63	0.63		0.15

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF4-50A(1/2")	A	No	No	Ar (CaAa)	124.00 - 62.00	0.00	-0.1	2	2	0.63	0.63		0.15
HB114-1-0813U4-M5J(1 1/4")	A	No	No	Ar (CaAa)	143.00 - 0.00	0.00	-0.1	4	4	1.00 0.50	1.54		1.20
LDF5-50A(7/8")	A	No	No	Ar (CaAa)	178.00 - 0.00	3.00	0	2	2	1.09	1.09		0.33
561(1-5/8")	A	No	No	Ar (CaAa)	164.00 - 0.00	0.00	0.02	14	8	1.00 0.50	1.63		1.35
***													
1.5" flat Cable Ladder Rail	B	No	No	Af (CaAa)	160.00 - 0.00	0.00	0.35	2	2	36.00 1.50	1.50		1.80
1.5" flat Cable Ladder Rail	B	No	No	Af (CaAa)	100.00 - 0.00	0.00	0.15	2	2	36.00 1.50	1.50		1.80
LDF6-50A(1-1/4")	B	No	No	Ar (CaAa)	93.00 - 0.00	0.00	0.15	13	13	1.00 0.50	1.55		0.66
LCF158-50JA-A0(1 5/8")	B	No	No	Ar (CaAa)	154.00 - 0.00	0.00	0.35	12	6	1.00 0.50	1.98		0.08
LDF4-50A(1/2")	B	No	No	Ar (CaAa)	104.00 - 0.00	0.00	0.4	1	1	0.63	0.63		0.15
LDF5-50A(7/8")	B	No	No	Ar (CaAa)	104.00 - 0.00	0.00	0.41	1	1	1.09	1.09		0.33
2" Conduit (1 1/2" EMT)	B	No	No	Ar (CaAa)	154.00 - 0.00	0.00	0.43	1	1	1.74	1.74		1.16
FB-L98B-002-75000(3/8")	B	No	No	Ar (CaAa)	154.00 - 0.00	0.00	0.43	1	1	0.39	0.38		0.06
WR-VG82ST-BRDA(5/8")	B	No	No	Ar (CaAa)	154.00 - 0.00	0.00	0.43	2	2	0.65	0.63		0.31
FB-L98B-002-75000(3/8)	B	No	No	Ar (CaAa)	154.00 - 0.00	3.00	0.35	1	1	0.39	0.39		0.06
WR-VG82ST-BRDA(5/8)	B	No	No	Ar (CaAa)	154.00 - 0.00	3.00	0.35	2	2	0.65	0.65		0.31
***													
1.5" flat Cable Ladder Rail	C	No	No	Af (CaAa)	170.00 - 0.00	-1.00	-0.35	4	2	36.00 1.50	1.50		1.80
CR 50 1873PE(1-5/8")	C	No	No	Ar (CaAa)	170.00 - 0.00	0.00	-0.35	6	4	1.00 0.50	1.98		0.83
LDF4-50A(1/2")	C	No	No	Ar (CaAa)	31.00 - 0.00	-1.00	-0.32	1	1	0.63	0.63		0.15
LDF1-50A(1/4")	C	No	No	Ar (CaAa)	170.00 - 0.00	0.00	-0.325	1	1	0.34	0.34		0.06
1.5" flat Cable Ladder Rail	A	No	No	Af (CaAa)	180.00 - 0.00	0.00	-0.3	2	2	48.00 1.50	1.50		1.80
***													

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD10017	A	From Leg	0.50	0.000	178.00	No Ice	4.11	4.11	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0 6			1/2" Ice 1" Ice 2" Ice	5.64 7.19 10.32	5.64 7.19 10.32	0.06 0.09 0.20
***									
***									
800 10504 w/ Mount Pipe	A	From Leg	2.00 0 1	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.59 4.01 4.42 5.26	3.18 3.91 4.58 5.98	0.04 0.07 0.11 0.21
800 10504 w/ Mount Pipe	B	From Leg	2.00 0 1	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.59 4.01 4.42 5.26	3.18 3.91 4.58 5.98	0.04 0.07 0.11 0.21
800 10504 w/ Mount Pipe	C	From Leg	2.00 0 1	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.59 4.01 4.42 5.26	3.18 3.91 4.58 5.98	0.04 0.07 0.11 0.21
860 10025	A	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
860 10025	B	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
860 10025	C	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
Side Arm Mount [SO 103-3]	A	None		0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.50 11.80 14.10 18.70	9.50 11.80 14.10 18.70	0.22 0.32 0.41 0.60
***									
Sector Mount [SM 702-3]	C	None		0.000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice	37.40 54.20 71.00 104.60	37.40 54.20 71.00 104.60	1.55 2.35 3.15 4.75
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.87 3.18 3.49 4.11	3.61 3.92 4.23 4.88	0.02 0.05 0.07 0.15
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.87 3.18 3.49 4.11	3.61 3.92 4.23 4.88	0.02 0.05 0.07 0.15
(2) APL868013-42T0 w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	164.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.87 3.18 3.49 4.11	3.61 3.92 4.23 4.88	0.02 0.05 0.07 0.15
(2) FD9R6004/2C-3L	A	From Leg	4.00 0 2	0.000	164.00	No Ice 1/2" Ice	0.31 0.39 0.47	0.08 0.12 0.17	0.00 0.01 0.01

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
						1" Ice	0.65	0.29	0.02
						2" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00 0 2	0.000	164.00	No Ice	0.31	0.08	0.00
						1/2" Ice	0.39	0.12	0.01
						1" Ice	0.47	0.17	0.01
						2" Ice	0.65	0.29	0.02
(2) FD9R6004/2C-3L	C	From Leg	4.00 0 2	0.000	164.00	No Ice	0.31	0.08	0.00
						1/2" Ice	0.39	0.12	0.01
						1" Ice	0.47	0.17	0.01
						2" Ice	0.65	0.29	0.02
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.00 0 2	0.000	164.00	No Ice	9.47	7.76	0.09
						1/2" Ice	10.09	9.00	0.17
						1" Ice	10.67	10.02	0.25
						2" Ice	11.83	11.90	0.46
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.00 0 2	0.000	164.00	No Ice	9.47	7.76	0.09
						1/2" Ice	10.09	9.00	0.17
						1" Ice	10.67	10.02	0.25
						2" Ice	11.83	11.90	0.46
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.00 0 2	0.000	164.00	No Ice	9.47	7.76	0.09
						1/2" Ice	10.09	9.00	0.17
						1" Ice	10.67	10.02	0.25
						2" Ice	11.83	11.90	0.46
B5 4T4R RRH4X40 AIRSCALE	A	From Leg	4.00 0 2	0.000	164.00	No Ice	1.32	0.75	0.05
						1/2" Ice	1.47	0.86	0.06
						1" Ice	1.62	0.98	0.07
						2" Ice	1.94	1.25	0.11
B5 4T4R RRH4X40 AIRSCALE	B	From Leg	4.00 0 2	0.000	164.00	No Ice	1.32	0.75	0.05
						1/2" Ice	1.47	0.86	0.06
						1" Ice	1.62	0.98	0.07
						2" Ice	1.94	1.25	0.11
B5 4T4R RRH4X40 AIRSCALE	C	From Leg	4.00 0 2	0.000	164.00	No Ice	1.32	0.75	0.05
						1/2" Ice	1.47	0.86	0.06
						1" Ice	1.62	0.98	0.07
						2" Ice	1.94	1.25	0.11
RFV01U-D2A	A	From Leg	4.00 0 2	0.000	164.00	No Ice	1.88	1.01	0.07
						1/2" Ice	2.05	1.14	0.09
						1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	B	From Leg	4.00 0 2	0.000	164.00	No Ice	1.88	1.01	0.07
						1/2" Ice	2.05	1.14	0.09
						1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	C	From Leg	4.00 0 2	0.000	164.00	No Ice	1.88	1.01	0.07
						1/2" Ice	2.05	1.14	0.09
						1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
B13 RRH 4X30	A	From Leg	4.00 0 2	0.000	164.00	No Ice	2.06	1.32	0.06
						1/2" Ice	2.24	1.48	0.07
						1" Ice	2.43	1.64	0.09
						2" Ice	2.84	2.00	0.14
B13 RRH 4X30	B	From Leg	4.00 0 2	0.000	164.00	No Ice	2.06	1.32	0.06
						1/2" Ice	2.24	1.48	0.07
						1" Ice	2.43	1.64	0.09

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
						1" Ice	2.84	2.00	0.14
						2" Ice			
B13 RRH 4X30	C	From Leg	4.00 0 2	0.000	164.00	No Ice	2.06	1.32	0.06
						1/2" Ice	2.24	1.48	0.07
						1" Ice	2.43	1.64	0.09
						2" Ice	2.84	2.00	0.14
DB-T1-6Z-8AB-0Z	B	From Leg	4.00 0 2	0.000	164.00	No Ice	4.80	2.00	0.04
						1/2" Ice	5.07	2.19	0.08
						1" Ice	5.35	2.39	0.12
						2" Ice	5.93	2.81	0.21
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0 2	0.000	164.00	No Ice	4.80	2.00	0.04
						1/2" Ice	5.07	2.19	0.08
						1" Ice	5.35	2.39	0.12
						2" Ice	5.93	2.81	0.21
***									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0 4	0.000	154.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0 4	0.000	154.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0 4	0.000	154.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
P65-16-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0 4	0.000	154.00	No Ice	8.37	6.36	0.08
						1/2" Ice	8.93	7.54	0.14
						1" Ice	9.46	8.43	0.22
						2" Ice	10.53	10.24	0.39
P65-16-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0 4	0.000	154.00	No Ice	8.37	6.36	0.08
						1/2" Ice	8.93	7.54	0.14
						1" Ice	9.46	8.43	0.22
						2" Ice	10.53	10.24	0.39
P65-16-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0 4	0.000	154.00	No Ice	8.37	6.36	0.08
						1/2" Ice	8.93	7.54	0.14
						1" Ice	9.46	8.43	0.22
						2" Ice	10.53	10.24	0.39
(2) LGP21401	A	From Leg	4.00 0 4	0.000	154.00	No Ice	1.10	0.35	0.01
						1/2" Ice	1.24	0.44	0.02
						1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
(2) LGP21401	B	From Leg	4.00 0 4	0.000	154.00	No Ice	1.10	0.35	0.01
						1/2" Ice	1.24	0.44	0.02
						1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
(2) LGP21401	C	From Leg	4.00 0 4	0.000	154.00	No Ice	1.10	0.35	0.01
						1/2" Ice	1.24	0.44	0.02
						1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
DC6-48-60-18-8F	B	From Leg	4.00 0	0.000	154.00	No Ice	0.92	0.92	0.02
							1.46	1.46	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0			1/2" Ice	1.64 2.04	1.64 2.04	0.06 0.11
						1" Ice 2" Ice			
(2) RRUS 11	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.10 0.15
(2) RRUS 11	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.10 0.15
(2) RRUS 11	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.10 0.15
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.14 0.21 0.30 0.49
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.14 0.21 0.30 0.49
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.14 0.21 0.30 0.49
TT19-08BP111-001	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.65 0.75 0.98	0.45 0.53 0.63 0.84	0.02 0.02 0.03 0.05
TT19-08BP111-001	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.65 0.75 0.98	0.45 0.53 0.63 0.84	0.02 0.02 0.03 0.05
TT19-08BP111-001	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.55 0.65 0.75 0.98	0.45 0.53 0.63 0.84	0.02 0.02 0.03 0.05
RRUS 32	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
RRUS 32	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
RRUS 32	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.86 3.08 3.32 3.81	1.78 1.97 2.17 2.58	0.06 0.08 0.10 0.16
DC6-48-60-18-8F	A	From Leg	4.00	0.000	154.00	No Ice	0.92	0.92	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0 4			1/2" Ice 1" Ice 2" Ice	1.46 1.64 2.04	1.46 1.64 2.04	0.04 0.06 0.11
RRUS 32 B2	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
DBC0061F1V51-2	A	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.21 0.28 0.35 0.52	0.41 0.50 0.59 0.79	0.01 0.02 0.02 0.04
DBC0061F1V51-2	B	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.21 0.28 0.35 0.52	0.41 0.50 0.59 0.79	0.01 0.02 0.02 0.04
DBC0061F1V51-2	C	From Leg	4.00 0 4	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.21 0.28 0.35 0.52	0.41 0.50 0.59 0.79	0.01 0.02 0.02 0.04
Sector Mount [SM 602-3]	A	None		0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	33.11 44.90 56.69 80.27	33.11 44.90 56.69 80.27	1.54 2.16 2.78 4.01
Pipe Mount [PM 601-3]	C	None		0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.39 5.48 6.57 8.75	4.39 5.48 6.57 8.75	0.20 0.24 0.28 0.36
(2) 5' x 2" Pipe Mount	A	From Leg	4.00 0 0	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.70 2.35	1.00 1.39 1.70 2.35	0.03 0.04 0.05 0.08
(2) 5' x 2" Pipe Mount	B	From Leg	4.00 0 0	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.70 2.35	1.00 1.39 1.70 2.35	0.03 0.04 0.05 0.08
(2) 5' x 2" Pipe Mount	C	From Leg	4.00 0 0	0.000	154.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.70 2.35	1.00 1.39 1.70 2.35	0.03 0.04 0.05 0.08
***									
800 EXTERNAL NOTCH FILTER	A	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.66 0.76 0.87 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04

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
800 EXTERNAL NOTCH FILTER	B	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.66 0.76 0.87 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04
800 EXTERNAL NOTCH FILTER	C	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.66 0.76 0.87 1.11	0.32 0.40 0.48 0.67	0.01 0.02 0.02 0.04
800MHZ 2X50W RRH	A	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.77 1.95 2.13 2.51	0.05 0.07 0.10 0.16
800MHZ 2X50W RRH	B	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.77 1.95 2.13 2.51	0.05 0.07 0.10 0.16
800MHZ 2X50W RRH	C	From Leg	1.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.13 2.32 2.51 2.92	1.77 1.95 2.13 2.51	0.05 0.07 0.10 0.16
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0 0	0.000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
***									
APXVSPP18-C-A20	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	5.28 5.74 6.20 7.14	0.06 0.11 0.16 0.29
APXVSPP18-C-A20	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	5.28 5.74 6.20 7.14	0.06 0.11 0.16 0.29
APXVSPP18-C-A20	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.02 8.48 8.94 9.89	5.28 5.74 6.20 7.14	0.06 0.11 0.16 0.29
(3) ACU-A20-N	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
(3) ACU-A20-N	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01

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" Ice			
(3) ACU-A20-N	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.07 0.10 0.15 0.26	0.12 0.16 0.21 0.34	0.00 0.00 0.00 0.01
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.58 7.03 7.47 8.38	4.96 5.75 6.47 7.94	0.08 0.13 0.19 0.34
TD-RRH8x20-25	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
Sector Mount [SM 701-3]	A	None		0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	19.73 27.41 35.09 50.45	19.73 27.41 35.09 50.45	0.82 1.17 1.51 2.19
12' horizontal x 2" Pipe Mount	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 2.11 2.84 4.32	1.00 2.11 2.84 4.32	0.10 0.65 1.21 2.39
12' horizontal x 2" Pipe Mount	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 2.11 2.84 4.32	1.00 2.11 2.84 4.32	0.10 0.65 1.21 2.39
12' horizontal x 2" Pipe Mount	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 2.11 2.84 4.32	1.00 2.11 2.84 4.32	0.10 0.65 1.21 2.39
***									
1142-2C	B	From Leg	4.00 0 7	0.000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.09 3.37 4.67 7.32	2.09 3.37 4.67 7.32	0.02 0.04 0.07 0.14
1142-2C	C	From Leg	4.00 0 7	0.000	124.00	No Ice 1/2" Ice	2.09 3.37 4.67	2.09 3.37 4.67	0.02 0.04 0.07

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
						1" Ice 2" Ice	7.32	7.32	0.14
Side Arm Mount [SO 306-1]	B	From Leg	2.00 0 0	0.000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.70 2.42 3.86	2.18 3.80 5.42 8.66	0.04 0.06 0.08 0.12
Side Arm Mount [SO 306-1]	C	From Leg	2.00 0 0	0.000	124.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.70 2.42 3.86	2.18 3.80 5.42 8.66	0.04 0.06 0.08 0.12
***									
220-3BN	B	From Leg	4.00 0 4	0.000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.72 7.83 9.96 14.27	5.72 7.83 9.96 14.27	0.02 0.07 0.12 0.27
1142-2C	C	From Leg	4.00 0 7	0.000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.09 3.37 4.67 7.32	2.09 3.37 4.67 7.32	0.02 0.04 0.07 0.14
Side Arm Mount [SO 306-1]	B	From Leg	2.00 0 0	0.000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.70 2.42 3.86	2.18 3.80 5.42 8.66	0.04 0.06 0.08 0.12
Side Arm Mount [SO 306-1]	C	From Leg	2.00 0 0	0.000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.98 1.70 2.42 3.86	2.18 3.80 5.42 8.66	0.04 0.06 0.08 0.12
***									
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.68 12.40 13.14 14.51	9.84 11.37 12.91 15.27	0.08 0.17 0.27 0.51
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.68 12.40 13.14 14.51	9.84 11.37 12.91 15.27	0.08 0.17 0.27 0.51
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.68 12.40 13.14 14.51	9.84 11.37 12.91 15.27	0.08 0.17 0.27 0.51
RRUS 11 B12	A	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.83 3.04 3.26 3.71	1.18 1.33 1.48 1.83	0.05 0.07 0.10 0.15
RRUS 11 B12	B	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.83 3.04 3.26 3.71	1.18 1.33 1.48 1.83	0.05 0.07 0.10 0.15
RRUS 11 B12	C	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.83 3.04 3.26 3.71	1.18 1.33 1.48 1.83	0.05 0.07 0.10 0.15

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
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.32 6.76 7.20 8.11	5.63 6.42 7.12 8.58	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.32 6.76 7.20 8.11	5.63 6.42 7.12 8.58	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.32 6.76 7.20 8.11	5.63 6.42 7.12 8.58	0.11 0.17 0.23 0.38
KRY 112 144/1	A	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	4.00 0 0	0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
Sector Mount [SM 1306-3]	C	None		0.000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice	49.30 52.20 55.10 60.90	49.30 52.20 55.10 60.90	2.29 2.68 3.07 3.85
***									
GPS_A	A	From Leg	2.00 0 3	0.000	62.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
Side Arm Mount [SO 301-1]	A	From Leg	1.00 0 0	0.000	62.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.78 2.56	0.90 1.42 1.94 2.98	0.02 0.03 0.04 0.06
***									
GPS_A	C	From Leg	2.00 0 2	0.000	42.00	No Ice 1/2" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01

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
						1" Ice 2" Ice	0.56	0.56	0.02
Side Arm Mount [SO 301-1]	C	From Leg	1.00 0 0	0.000	42.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.78 2.56	0.90 1.42 1.94 2.98	0.02 0.03 0.04 0.06
***									
GPS_A	C	From Leg	2.00 0 1	0.000	31.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
Side Arm Mount [SO 301-1]	C	From Leg	1.00 0 0	0.000	31.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.39 1.78 2.56	0.90 1.42 1.94 2.98	0.02 0.03 0.04 0.06
***									
(2) 3'x8'' Knife Plate	A	From Leg	0.00 0 0	0.000	20.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
(2) 3'x8'' Knife Plate	B	From Leg	0.00 0 0	0.000	20.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
(2) 3'x8'' Knife Plate	C	From Leg	0.00 0 0	0.000	20.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
(2) 3'x8'' Knife Plate	A	From Leg	0.00 0 0	0.000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
(2) 3'x8'' Knife Plate	B	From Leg	0.00 0 0	0.000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
(2) 3'x8'' Knife Plate	C	From Leg	0.00 0 0	0.000	60.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.33 2.63 2.92 3.50	0.25 0.50 0.75 1.25	0.05 0.05 0.06 0.07
**									
6' x 2'' Mount Pipe	A	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2'' Mount Pipe	B	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6' x 2'' Mount Pipe	C	From Leg	2.00 0 0	0.000	170.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09

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
***								

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
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
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 Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 168	4.13	43	0.224	0.051
T2	168 - 160	3.57	43	0.222	0.052
T3	160 - 140	3.20	43	0.214	0.051
T4	140 - 120	2.35	43	0.179	0.045
T5	120 - 100	1.65	43	0.141	0.038
T6	100 - 80	1.11	43	0.105	0.030
T7	80 - 60	0.70	43	0.078	0.022
T8	60 - 40	0.39	43	0.057	0.015
T9	40 - 20	0.18	43	0.036	0.010
T10	20 - 0	0.05	43	0.014	0.005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	PD10017	43	4.04	0.224	0.052	822804
170.00	800 10504 w/ Mount Pipe	43	3.66	0.223	0.052	359813
164.00	Sector Mount [SM 702-3]	43	3.38	0.219	0.052	85935
154.00	(2) 7770.00 w/ Mount Pipe	43	2.93	0.205	0.050	40200
146.00	800 EXTERNAL NOTCH FILTER	43	2.59	0.190	0.048	32383
143.00	APXVSPP18-C-A20	43	2.46	0.184	0.047	30222
124.00	1142-2C	43	1.77	0.148	0.039	29123
104.00	220-3BN	43	1.21	0.111	0.031	35428
93.00	LNX-6515DS-VTM w/ Mount Pipe	43	0.95	0.094	0.027	41083
62.00	GPS_A	43	0.42	0.059	0.016	50178
60.00	(2) 3'x8" Knife Plate	43	0.39	0.057	0.015	50322
42.00	GPS_A	43	0.19	0.038	0.010	54965
31.00	GPS_A	43	0.11	0.025	0.008	54483
20.00	(2) 3'x8" Knife Plate	43	0.05	0.014	0.005	55537

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 168	16.47	10	0.893	0.206
T2	168 - 160	14.23	10	0.884	0.207
T3	160 - 140	12.75	10	0.852	0.205
T4	140 - 120	9.35	10	0.711	0.182
T5	120 - 100	6.57	10	0.561	0.151
T6	100 - 80	4.42	10	0.417	0.120
T7	80 - 60	2.79	10	0.309	0.088
T8	60 - 40	1.56	10	0.227	0.060
T9	40 - 20	0.71	10	0.142	0.040
T10	20 - 0	0.21	10	0.055	0.019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	PD10017	10	16.10	0.893	0.206	214634

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
170.00	800 10504 w/ Mount Pipe	10	14.60	0.888	0.207	93500
164.00	Sector Mount [SM 702-3]	10	13.48	0.871	0.206	21967
154.00	(2) 7770.00 w/ Mount Pipe	10	11.67	0.815	0.200	10161
146.00	800 EXTERNAL NOTCH FILTER	10	10.31	0.757	0.191	8148
143.00	APXVSPP18-C-A20	10	9.82	0.734	0.186	7595
124.00	1142-2C	10	7.07	0.591	0.157	7307
104.00	220-3BN	10	4.81	0.444	0.126	8890
93.00	LNX-6515DS-VTM w/ Mount Pipe	10	3.80	0.375	0.108	10312
62.00	GPS_A	10	1.67	0.235	0.062	12592
60.00	(2) 3'x8" Knife Plate	10	1.56	0.227	0.060	12628
42.00	GPS_A	10	0.78	0.151	0.042	13811
31.00	GPS_A	10	0.44	0.101	0.030	13690
20.00	(2) 3'x8" Knife Plate	10	0.21	0.055	0.019	13953

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Diagonal	A325N	0.63	1	0.57	7.12	0.080 ✔	1.05	Member Block Shear
		Top Girt	A325N	0.63	1	0.15	5.08	0.029 ✔	1.05	Member Block Shear
T2	168	Leg	A325N	0.63	4	1.86	20.34	0.092 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	2.53	7.12	0.355 ✔	1.05	Member Block Shear
T3	160	Leg	A325N	0.63	4	10.17	20.34	0.500 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	4.28	7.12	0.602 ✔	1.05	Member Block Shear
T4	140	Leg	A325N	0.75	4	18.47	30.10	0.614 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	5.15	7.12	0.724 ✔	1.05	Member Block Shear
T5	120	Leg	A325N	0.75	4	25.82	30.10	0.858 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	5.17	9.91	0.521 ✔	1.05	Member Block Shear
T6	100	Leg	A325N	0.88	4	32.90	41.56	0.792 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	6.57	9.91	0.662 ✔	1.05	Member Block Shear
T7	80	Diagonal	A325N	0.63	1	7.78	10.93	0.711 ✔	1.05	Member Block Shear
T8	60	Leg	A325N	1.00	4	46.37	54.52	0.851 ✔	1.05	Bolt Tension
		Diagonal	A325N	0.63	1	8.41	13.81	0.609 ✔	1.05	Bolt Shear
T9	40	Diagonal	A325N	0.63	1	9.72	13.81	0.704 ✔	1.05	Bolt Shear
		Secondary Horizontal	A325N	0.50	1	4.32	8.84	0.489 ✔	1.05	Bolt Shear
T10	20	Diagonal	A325N	0.63	1	10.05	13.81	0.728 ✔	1.05	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	Pipe 2.375" x 0.154" (2 STD)	12.00	4.00	61.0 K=1.00	1.07	-2.24	27.98	0.080 [1] ✔
T2	168 - 160	Pipe 2.375" x 0.154" (2 STD) (GR)	8.00	4.00	61.0 K=1.00	1.07	-10.61	38.43	0.276 [1] ✔
T3	160 - 140	Pipe 3.5" x 0.216" (3 STD) (GR)	20.03	5.01	51.7 K=1.00	2.23	-49.80	87.01	0.572 [1] ✔
T4	140 - 120	Pipe 4" x 0.318" (3.5 XS) (GR)	20.03	6.68	61.3 K=1.00	3.68	-86.31	122.13	0.707 [1] ✔
T5	120 - 100	Pipe 4.5" x 0.337" (4 XS) (GR)	20.03	6.68	54.3 K=1.00	4.41	-119.01	157.19	0.757 [1] ✔
T6	100 - 80	Pipe 5.563" x 0.375" (5 XS) (GR)	20.03	6.68	43.6 K=1.00	6.11	-153.85	242.30	0.635 [1] ✔
T7	80 - 60	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	10.02	54.8 K=1.00	8.40	-185.16	314.32	0.589 [1] ✔
T8	60 - 40	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	10.02	54.8 K=1.00	8.40	-218.10	314.32	0.694 [1] ✔
T9	40 - 20	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	5.15	28.2 K=1.00	8.40	-249.09	362.71	0.687 [1] ✔
T10	20 - 0	Pipe 8.625" x 0.500" (8 XS) (GR)	20.03	10.02	41.8 K=1.00	12.76	-281.16	543.63	0.517 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L 2 x 1.5 x 3/16 LLV	4.63	2.19	91.3 K=1.12	0.62	-0.61	16.50	0.037 [1] ✔
T2	168 - 160	L 2 x 1.5 x 3/16 LLV	4.63	2.19	91.3 K=1.12	0.62	-2.62	16.50	0.159 [1] ✔
T3	160 - 140	L 2 x 1.5 x 3/16 LLV	6.52	3.28	122.1 K=1.00	0.62	-4.34	11.87	0.366 [1] ✔
T4	140 - 120	L 2 x 2 x 3/16	9.07	4.61	140.3 K=1.00	0.71	-4.97	10.40	0.478 [1] ✔
T5	120 - 100	L 2.5 x 2 x 3/16 LLV	10.69	5.38	151.3 K=1.00	0.81	-5.20	10.11	0.515 [1] ✔
T6	100 - 80	L 2.5 x 2.5 x 3/16	12.40	6.23	151.0 K=1.00	0.90	-6.54	11.32	0.577 [1] ✔
T7	80 - 60	L 3 x 3 x 3/16	15.56	7.92	159.4 K=1.00	1.09	-7.85	12.27	0.639 [1] ✔
T8	60 - 40	L 3.5 x 3 x 1/4 LLV	17.20	8.73	166.1 K=1.00	1.56	-8.41	16.19	0.519 [1] ✔
T9	40 - 20	L 3.5 x 3 x 1/4 LLV	18.92	9.73	185.1 K=1.00	1.56	-9.72	13.04	0.745 [1] ✔
T10	20 - 0	L 3.5 x 3.5 x 1/4	20.53	10.38	179.5 K=1.00	1.69	-10.05	15.01	0.670 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	40 - 20	L 3.5 x 3.5 x 1/4	17.49	8.47	146.4 K=1.00	1.69	-4.32	22.57	0.191 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L 2 x 1.5 x 3/16 LLH	4.00	3.55	132.4 K=1.00	0.62	-0.13	10.14	0.013 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	Pipe 2.375" x 0.154" (2 STD)	12.00	4.00	61.0	1.07	1.66	33.85	0.049 [1] ✔
T2	168 - 160	Pipe 2.375" x 0.154" (2 STD) (GR)	8.00	4.00	61.0	1.07	7.45	33.85	0.220 [1] ✔
T3	160 - 140	Pipe 3.5" x 0.216" (3 STD) (GR)	20.03	5.01	51.7	2.23	40.68	70.20	0.579 [1] ✔
T4	140 - 120	Pipe 4" x 0.318" (3.5 XS) (GR)	20.03	6.68	61.3	3.68	73.88	115.87	0.638 [1] ✔
T5	120 - 100	Pipe 4.5" x 0.337" (4 XS) (GR)	20.03	6.68	54.3	4.41	103.29	138.83	0.744 [1] ✔
T6	100 - 80	Pipe 5.563" x 0.375" (5 XS) (GR)	20.03	6.68	43.6	6.11	131.59	192.53	0.683 [1] ✔
T7	80 - 60	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	10.02	54.8	8.40	158.27	264.76	0.598 [1] ✔
T8	60 - 40	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	10.02	54.8	8.40	185.47	264.76	0.701 [1] ✔
T9	40 - 20	Pipe 6.625" x 0.432" (6 XS) (GR)	20.03	4.87	26.6	8.40	210.58	264.76	0.795 [1] ✔
T10	20 - 0	Pipe 8.625" x 0.500" (8 XS) (GR)	20.03	10.02	41.8	12.76	234.82	402.03	0.584 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L 2 x 1.5 x 3/16 LLV	4.63	2.19	63.2	0.36	0.57	15.68	0.036 [1] ✔
T2	168 - 160	L 2 x 1.5 x 3/16 LLV	4.63	2.19	63.2	0.36	2.53	15.68	0.161 [1] ✔
T3	160 - 140	L 2 x 1.5 x 3/16 LLV	6.52	3.28	92.9	0.36	4.28	15.68	0.273 [1] ✔
T4	140 - 120	L 2 x 2 x 3/16	8.11	4.14	83.0	0.43	5.15	18.74	0.275 [1] ✔
T5	120 - 100	L 2.5 x 2 x 3/16 LLV	10.69	5.38	110.7	0.50	5.17	21.81	0.237 [1] ✔
T6	100 - 80	L 2.5 x 2.5 x 3/16	12.40	6.23	98.2	0.57	6.57	24.84	0.264 [1] ✔
T7	80 - 60	L 3 x 3 x 3/16	15.56	7.92	103.1	0.71	7.78	30.97	0.251 [1] ✔
T8	60 - 40	L 3.5 x 3 x 1/4 LLV	17.20	8.73	116.7	1.03	8.31	44.78	0.186 [1] ✔
T9	40 - 20	L 3.5 x 3 x 1/4 LLV	18.92	9.73	127.9	1.03	8.92	44.78	0.199 [1] ✔
T10	20 - 0	L 3.5 x 3.5 x 1/4	20.53	10.38	115.8	1.13	9.39	49.02	0.192 [1] ✔

[1] $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T9	40 - 20	L 3.5 x 3.5 x 1/4	17.49	8.47	186.3	1.15	4.32	50.04	0.086 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 168	L 2 x 1.5 x 3/16 LLH	4.00	3.55	103.8	0.36	0.15	15.68	0.009 [1] ✔

[1] $P_u / \phi P_n$ controls

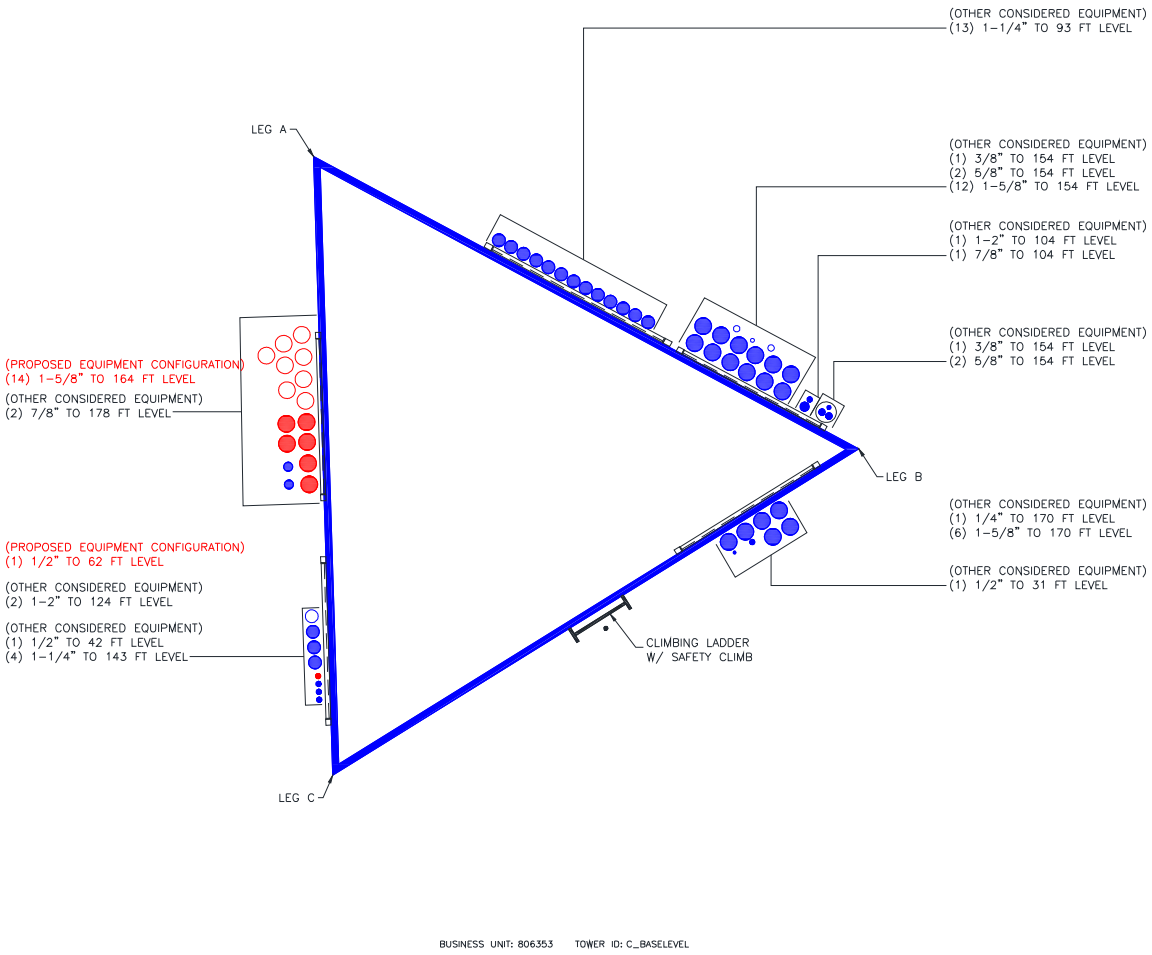
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 168	Leg	Pipe 2.375" x 0.154" (2 STD)	1	-2.24	29.38	7.6	Pass
T2	168 - 160	Leg	Pipe 2.375" x 0.154" (2 STD) (GR)	26	-10.61	40.35	26.3	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T3	160 - 140	Leg	Pipe 3.5" x 0.216" (3 STD) (GR)	41	40.68	73.71	55.2	Pass
T4	140 - 120	Leg	Pipe 4" x 0.318" (3.5 XS) (GR)	68	-86.31	128.24	67.3	Pass
T5	120 - 100	Leg	Pipe 4.5" x 0.337" (4 XS) (GR)	89	-119.01	165.05	72.1 81.7 (b)	Pass
T6	100 - 80	Leg	Pipe 5.563" x 0.375" (5 XS) (GR)	110	131.59	202.15	65.1 75.4 (b)	Pass
T7	80 - 60	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	131	158.27	277.99	56.9	Pass
T8	60 - 40	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	146	185.47	277.99	66.7 81.0 (b)	Pass
T9	40 - 20	Leg	Pipe 6.625" x 0.432" (6 XS) (GR)	161	210.58	277.99	75.7	Pass
T10	20 - 0	Leg	Pipe 8.625" x 0.500" (8 XS) (GR)	182	234.82	422.13	55.6	Pass
T1	180 - 168	Diagonal	L 2 x 1.5 x 3/16 LLV	11	-0.61	17.33	3.5 7.6 (b)	Pass
T2	168 - 160	Diagonal	L 2 x 1.5 x 3/16 LLV	29	2.53	16.46	15.3 33.8 (b)	Pass
T3	160 - 140	Diagonal	L 2 x 1.5 x 3/16 LLV	43	-4.34	12.46	34.9 57.3 (b)	Pass
T4	140 - 120	Diagonal	L 2 x 2 x 3/16	70	-4.97	10.92	45.5 68.9 (b)	Pass
T5	120 - 100	Diagonal	L 2.5 x 2 x 3/16 LLV	92	-5.20	10.62	49.0 49.6 (b)	Pass
T6	100 - 80	Diagonal	L 2.5 x 2.5 x 3/16	112	-6.54	11.89	55.0 63.1 (b)	Pass
T7	80 - 60	Diagonal	L 3 x 3 x 3/16	133	-7.85	12.89	60.9 67.7 (b)	Pass
T8	60 - 40	Diagonal	L 3.5 x 3 x 1/4 LLV	148	-8.41	17.00	49.5 58.0 (b)	Pass
T9	40 - 20	Diagonal	L 3.5 x 3 x 1/4 LLV	163	-9.72	13.69	71.0	Pass
T10	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	184	-10.05	15.76	63.8 69.3 (b)	Pass
T9	40 - 20	Secondary Horizontal	L 3.5 x 3.5 x 1/4	169	-4.32	23.70	18.2 46.6 (b)	Pass
T1	180 - 168	Top Girt	L 2 x 1.5 x 3/16 LLH	5	-0.13	10.65	1.2 2.8 (b)	Pass
							Summary	
						Leg (T5)	81.7	Pass
						Diagonal (T9)	71.0	Pass
						Secondary Horizontal (T9)	46.6	Pass
						Top Girt (T1)	2.8	Pass
						Bolt Checks	81.7	Pass
						RATING =	**81.7**	**Pass**

APPENDIX B

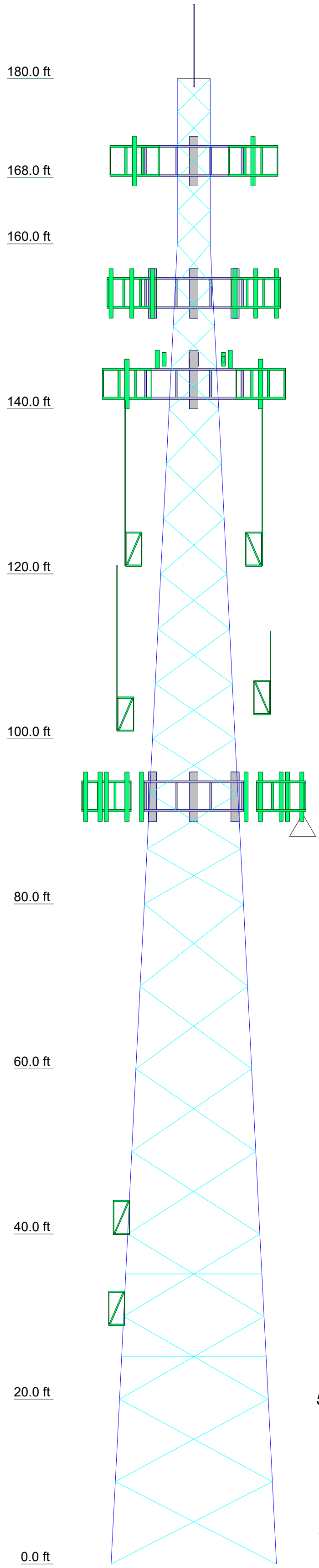
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Sec. Horizontals	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	A	A53-B-35	L 2 x 1.5 x 3/16 LLV	A36	H	N.A.	4	5 @ 4	0.4
T2	B				N.A.				0.3
T3	C							4 @ 5	1.4
T4	D		L 2 x 2 x 3/16				6	9 @ 6.66667	1.9
T5	E		L 2.5 x 2 x 3/16 LLV				8		2.4
T6	F		L 2.5 x 2.5 x 3/16				10		3.5
T7	Pipe 6.625" x 0.432" (6 XS) (GR)		L 3 x 3 x 3/16				12	8 @ 10	4.6
T8			L 3.5 x 3 x 1/4 LLV				14		5.1
T9						L 3.5 x 3.5 x 1/4	16		5.9
T10	G		L 3.5 x 3.5 x 1/4			N.A.	18 / 20		7.9
							20		33.5



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pipe 2.375" x 0.154" (2 STD)	E	Pipe 4.5" x 0.337" (4 XS) (GR)
B	Pipe 2.375" x 0.154" (2 STD) (GR)	F	Pipe 5.563" x 0.375" (5 XS) (GR)
C	Pipe 3.5" x 0.216" (3 STD) (GR)	G	Pipe 8.625" x 0.500" (8 XS) (GR)
D	Pipe 4" x 0.318" (3.5 XS) (GR)	H	L 2 x 1.5 x 3/16 LLH

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Grouted pipe f'c is 7 ksi
9. see additional calcs for flange capacity at 60' and 20', considering the weakest link weld in the jump plate design
10. TIA-222-H Annex S
11. TOWER RATING: 81.7%

ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 289 K
SHEAR: 29 K

UPLIFT: -240 K
SHEAR: 26 K

AXIAL 155 K
SHEAR 14 K
MOMENT 1463 kip-ft
TORQUE 19 kip-ft
50 mph WIND - 1.27 in ICE

AXIAL 68 K
SHEAR 46 K
MOMENT 4605 kip-ft
TORQUE 63 kip-ft
REACTIONS - 120 mph WIND

PJF
Paul J. Ford and Company
250 East Broad st., Suite 600
Columbus, OH 43215
Phone: (614) 221-6679
FAX:

Job: ***180-ft S/S Tower - Wilton, CT***		
Project: ***PJF# 37517-2777-001-8700 (BU# 806353)***		
Client: Crown Castle	Drawn by: mbange	App'd:
Code: TIA-222-H	Date: 10/08/18	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2018\37518-3356_806353_BRG 124 943066\37518-3356.001.8700_SA_1641659\TNX\37518-3356.001.8700.eri		Dwg No. E-1

37518-3356.001.8700

Capacity of the flange bolts at 20' = 53.01 x 4 = 212.04
Capacity of the existing weld at the jump plate= 33 kips
Total capacity at the flange at 20' = 245 kips
Actual tensile force at 20' = 219.24 kips
% ratio = 210.58/245 = 86%

CCIplate

Project Information

BU #	806353
Site Name	
Order #	

Tower Information

Tower Type	Self Support
TIA-222 Rev	H

☑ Apply TIA-222-H Section 15.5

Applied Loads

	Comp.	Uplift
Axial (k)	289.00	240.00
Shear (k)	29.00	26.00

Anchor Rod Data

Quantity:	6
Diameter (in):	1.5
Material Grade:	A36
Grout Considered:	Yes
l_{ar} (in):	2
Eta Factor, η:	
Thread Type:	N-Included
Configuration:	Symmetrical

Fy=36 ksi Fu=58 ksi

Anchor Rod Results

Axial, Pu_c (kips)	48.17
Shear, Vu (kips)	4.83
Moment, Mu (kip-in)	-
Axial Cap., φPn_c (kips)	50.76
Shear Cap., ϕVn (kips)	15.23
Moment Cap., ϕMn (kip-in)	-
Stress Rating	100.0%

Pass

Drilled Pier Foundation

BU # :	806353
Site Name:	
Order Number:	

TIA-222 Revison:	H
Tower Type:	Self Support

Applied Loads	Comp.	Uplift
Moment (kip-ft)		
Axial Force (kips)	289	240
Shear Force (kips)	29	26

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

Pier Design Data		
Depth	10.5	ft
Ext. Above Grade	0.25	ft
Pier Section 1		
From 0.25' above grade to 10.5' below grade		
Pier Diameter	2.5	ft
Rebar Quantity	14	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	4	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.70	6.70
Soil Safety Factor	4.03	4.49
Max Moment (kip-ft)	163.22	146.34
Rating*	*31.5%*	*28.2%*
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	121.23	121.23
End Bearing (kips)	206.28	-
Weight of Concrete (kips)	9.50	7.12
Total Capacity (kips)	327.51	308.36
Axial (kips)	298.50	240.00
Rating*	*86.8%*	*74.1%*
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.70	6.50
Critical Moment (kip-ft)	163.22	145.63
Critical Moment Capacity	558.32	351.84
Rating*	*27.8%*	*39.4%*

Soil Interaction Rating*	**86.8%**
Structural Foundation Rating*	**39.4%**

*Rating per TIA-222-H Section 15.5

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

Soil Profile			
Groundwater Depth	n/a	ft	# of Layers: 3

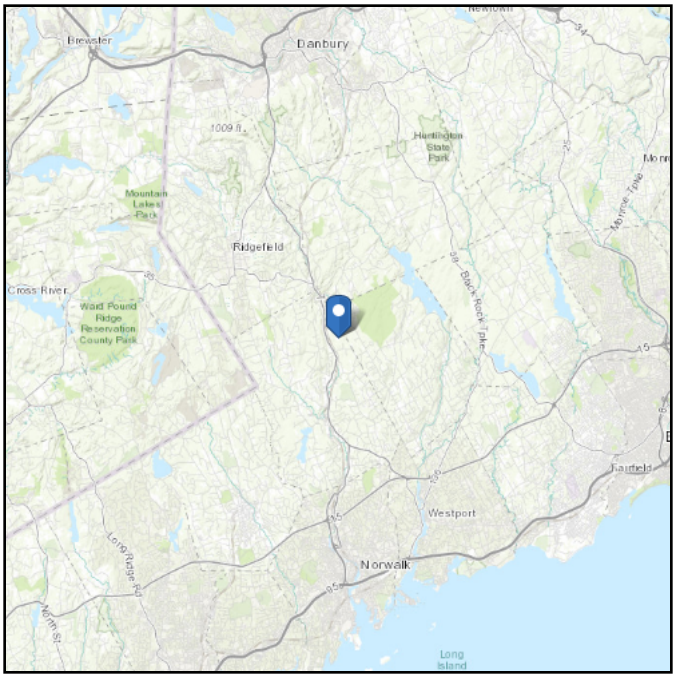
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	5	5	110	150	0	30	0.000	0.000	0.00	0.00			Cohesionless
2	5	6	1	110	150	0	30	0.000	0.000	0.77	0.77			Cohesionless
3	6	10.5	4.5	140	150	8	0	3.600	3.600	4.40	4.40	56.03		Cohesive

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 426.37 ft (NAVD 88)
Latitude: 41.238428
Longitude: -73.424011



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	91 Vmph
100-year MRI	97 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:	Mon Oct 08 2018

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

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

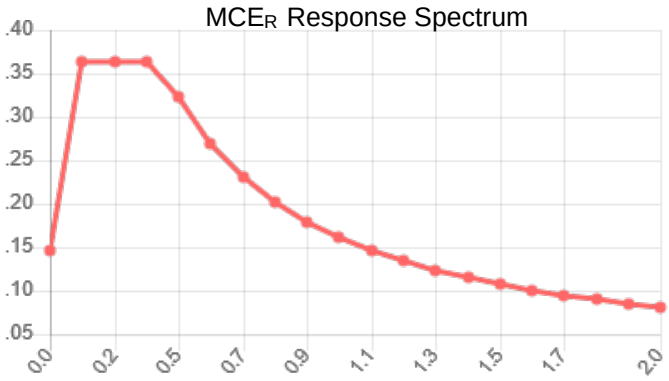
Seismic

Site Soil Class: D - Stiff Soil

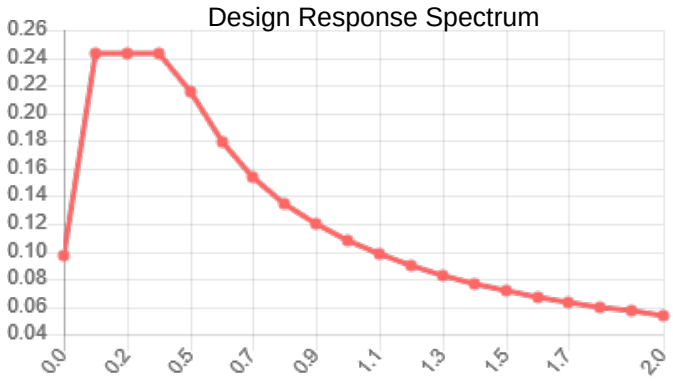
Results:

S_S :	0.227	S_{DS} :	0.243
S_1 :	0.067	S_{D1} :	0.108
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.127
S_{MS} :	0.364	PGA_M :	0.197
S_{M1} :	0.162	F_{PGA} :	1.546
		I_e :	1

Seismic Design Category B



Sa (g) vs T(s)



Sa (g) vs T(s)

Data Accessed: Mon Oct 08 2018

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Oct 08 2018

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

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

PAUL J. FORD & COMPANY

Date: October 16, 2018

Charles Mcguirt
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject:	**Mount Analysis Report**	
Carrier Designation:	***Verizon Wireless* Equipment Change-out**	
	Carrier Site Number:	1976
	Carrier Site Name:	WILTON CT
Crown Castle Designation:	**Crown Castle BU Number:**	806353
	Crown Castle Site Name:	BRG 124 943066
	Crown Castle JDE Job Number:	535165
	Crown Castle Purchase Order Number:	1268852
	Crown Castle Order Number:	461645 Rev. 3
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37518-3356.002.8190
Site Data:	**128 Mather St, Wilton, Fairfield County, CT** **Latitude 41.238428°, Longitude -73.424011°**	
Structure Information:	**Tower Height & Type:**	**180 Foot Self Support**
	Mount Elevation:	**164 Foot**
	Mount Type:	**(3) 16 Foot Sector Frames**

Dear Charles Mcguirt,

Paul J Ford and Company is pleased to submit this "Mount Analysis Report" to determine the structural integrity of the Verizon Wireless antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

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

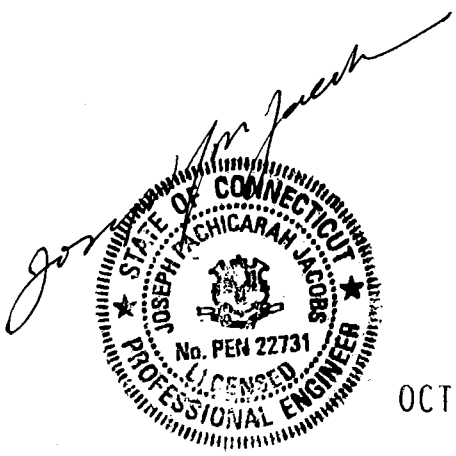
16' Sector Frames (typical) 83.6% SUFFICIENT*
*** Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 120 mph from the 2018 Connecticut Building Code. Exposure Category B with a maximum topographic factor, Kzt, of 1.000 and Risk Category II was used in this analysis.

Structural analysis prepared by: Steven Pozz

Respectfully submitted by:

Deepesh Savla, P.E.
Project Engineer
DSavla@pauljford.com



OCT 16 2018

PAUL J. FORD & COMPANY

Date: October 16, 2018

Charles Mcguirt
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject:	**Mount Analysis Report**	
Carrier Designation:	***Verizon Wireless* Equipment Change-out**	
	Carrier Site Number:	1976
	Carrier Site Name:	WILTON CT
Crown Castle Designation:	**Crown Castle BU Number:**	806353
	Crown Castle Site Name:	BRG 124 943066
	Crown Castle JDE Job Number:	535165
	Crown Castle Purchase Order Number:	1268852
	Crown Castle Order Number:	461645 Rev. 3
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37518-3356.002.8190
Site Data:	**128 Mather St, Wilton, Fairfield County, CT** **Latitude 41.238428°, Longitude -73.424011°**	
Structure Information:	**Tower Height & Type:**	**180 Foot Self Support**
	Mount Elevation:	**164 Foot**
	Mount Type:	**(3) 16 Foot Sector Frames**

Dear Charles Mcguirt,

Paul J Ford and Company is pleased to submit this "Mount Analysis Report" to determine the structural integrity of the Verizon Wireless antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

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

16' Sector Frames (typical) 83.6% SUFFICIENT*
*** Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 120 mph from the 2018 Connecticut Building Code. Exposure Category B with a maximum topographic factor, Kzt, of 1.000 and Risk Category II was used in this analysis.

Structural analysis prepared by: Steven Pozz

Respectfully submitted by:

Deepesh Savla, P.E.
Project Engineer
DSavla@pauljford.com

TABLE OF CONTENTS

1) INTRODUCTION

The existing mounts under consideration are (3) 16' Sector Frames mounts installed at the 164' elevation on a 180' Self Support tower. The existing mounts were estimated based on photos and models of previously analyzed mounts of similar type.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 120 mph
Exposure Category: B
Topographic Factor at Base: 1.000
Topographic Factor at Mount: 1.000
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
164	166	6	Commscope	JAHH-65B-R3B	(3) 16' Sector Frames
		6	RFS Celwave	APL868013-42T0	
		3	Alcatel Lucent	B13 RRH4X30	
		3	Nokia	B5 4T4R RRH4X40 AIRSCALE	
		6	RFS Celwave	FD9R6004/2C-3L	
		2	RFS Celwave	DB-T1-6Z-8AB-0Z	
		3	Samsung Telecommunications	RFV01U-D2A	
62	65	1	GPS	GPS_A	Tower Mounted

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Tower Manufacturer Drawings	Doc ID: 217757 Dated: 05/06/1988	-	CCISites
Photos	Dated: 07/09/2018	-	CCISites
TIA Inspection	Dated: 04/12/2015	-	CCISites
Order	ID: 461645 Rev. 3 Dated: 09/27/2018	-	CCISites

3.1) Analysis Method

RISA-3D (version 15.0.4), 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 C.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B).

3.2) Assumptions

1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades are as follows, unless noted otherwise:*
   - *a) Channel, Solid Round, Angle, Plate, Unistrut* — *ASTM A36 (GR 36)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular)* — *ASTM 500 (GR B-46)*
   - *d) HSS (Round)* — *ASTM 500 (GR B-42)*
   - *e) Threaded Rods* — *ASTM F1554 (GR 36)*
   - *f) Connection Bolts* — *ASTM A325*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*
7) *Mount has been modeled based on the photographs and/or the TIA inspection referenced in Table 3. Member information and dimensions not provided have been assumed based on previous experience with similar mounts. No guarantee can be made as to the accuracy of these assumptions without a complete mount mapping.*
8) *Proposed antennas are installed on 8-ft long, P3 STD (3.50" O.D. x 0.216") mount pipes.*
9) *SitePro1 STK-U Stiff Arm Kits are installed properly as shown in manufacturer drawings attached at the end of this report.*

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the mount

4) ANALYSIS RESULTS

Table 3 - Mount Component Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Face Horizontals	164	81.2	Pass
1	Standoff Horizontals		83.6	Pass
1	Tie Backs		15.2	Pass
1	Bracing Members		54.1	Pass
1	Mount Pipes		22.1	Pass
1	Mount to Tower Connection		9.7	Pass

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
N55A	Existing	3922	Leg	P2.0x0.154	1922	1, 2

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

Mount Rating (max from all components) =	83.6%

Notes:
1) See additional documentation in "Appendix C – Software Analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount will have sufficient capacity to carry the proposed loading configuration once the recommendations listed below are met and properly installed:

- Install SitePro1 STK-U Stiff Arm Kits or EOR approved equivalent in accordance with attached manufacturer drawings. Connection to tower must be to adjacent tower leg. See Appendix D for details.
- Install proposed antennas on 8-ft long, P3 STD (3.50" O.D. x 0.216") mount pipes.
- Relocate existing stiff-arm to location specified in Appendix D and connect back to the adjacent tower leg.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING MOUNTS BY PAUL J. FORD AND COMPANY

1) It is the responsibility of the client to ensure that the information provided to Paul J. Ford and Company is accurate and complete. Paul J. Ford and Company will rely on the accuracy and completeness of such information in performing or furnishing services under this project.

2) If the existing conditions are not as represented on the referenced drawings and/or documents, Paul J. Ford and Company should be contacted immediately to evaluate the significance of the deviation.

3) The mount has been analyzed according to the minimum design loads recommended by the Reference Standard. If additional design loads are required, Paul J. Ford and Company should be made aware of this prior to the start of the project.

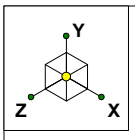
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

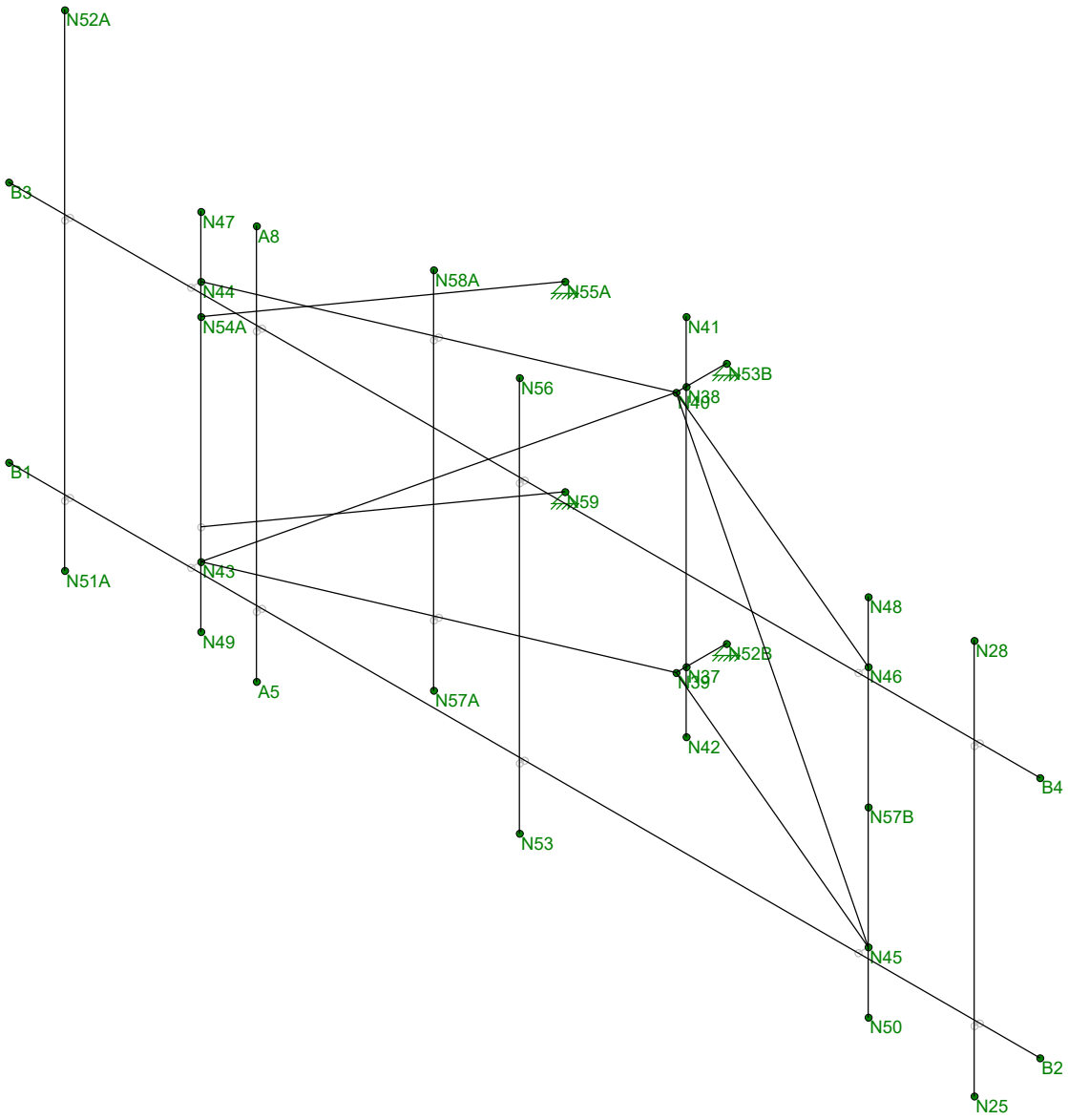
5) All Services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Paul J. Ford and Company is not responsible for the conclusions, opinions and/or recommendations made by others based on the information supplied herein.

****

APPENDIX A

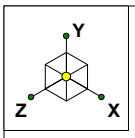
WIRE FRAME AND RENDERED MODELS

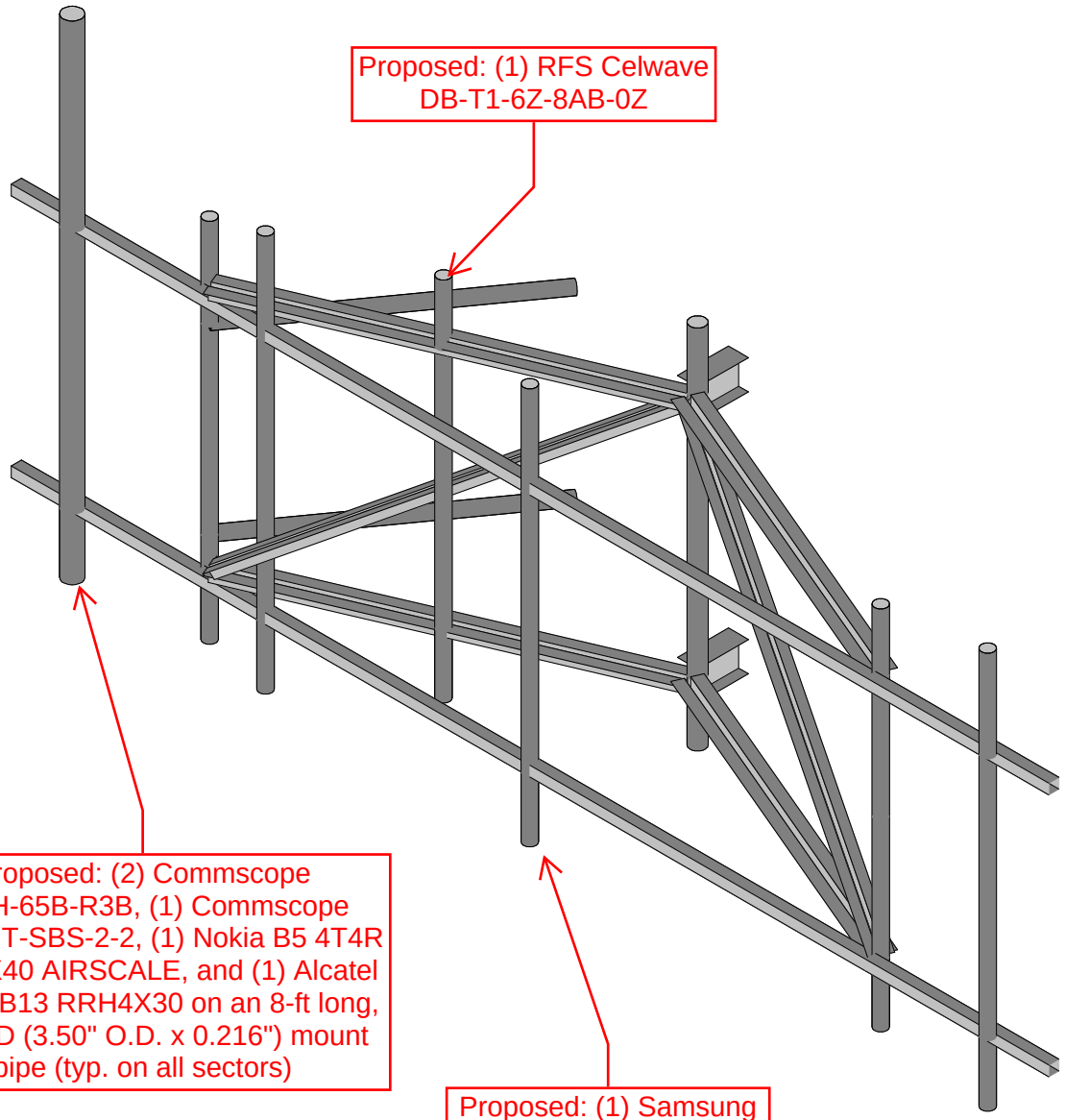




Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 1
STP		Oct 16, 2018 at 3:33 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d





Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 2
STP		Oct 16, 2018 at 3:33 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d

APPENDIX B

SOFTWARE INPUT CALCULATION

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # 37518-3356.002.8190
By STP

Date: 10/16/18

Analysis 30 degrees

v1.0, Effective 04/03/2018

Mount Loading per TIA-222-H

Structure Information

Mount Type =	1 Sector	
Mount Elev, z =	164	ft
Ground Elev, z_s =	426	ft
Wind Speed =	120	mph
Ice Wind Speed =	50	mph
Ice Thickness =	1.5	in
Exposure Cat =	B	
Structure Class =	II	
Topographic Cat =	1	
Crest Height =	0	ft

Velocity Pressure Coefficients

z_g =	1200	ft	
a =	7.00		
K_{zmin} =	0.70		
K_z =	1.14		Calculated Value
Ke =	0.98		Ground Elevation Factor
K_z =	1.14		Velocity Press Coef (Section 2.6.5.2)
K_{zt} =	1.00		Topographic Factor (Section 2.6.6.4)
Gh =	1.00		Gust Effect Factor (Section 2.6.7)
K_d =	0.95		Wind Dir Probability Factor (Table 2-2)
K_a =	0.90		Shielding factor (Section 16.6)
q_z=	35.33	psf	Velocity Pressure (Section 2.6.9.6)

Ice Loading

Ii =	1.00		Ice Importance Factor (Table 2-3)
Iwi =	1.00		Wind Ice Importance Factor (Table 2-3)
q_z=	6.92	psf	Ice Velocity Pressure (Section 2.6.9.6)
K_{iz} =	1.17		Ice Escalation Factor (Section 2.6.8)
T_{iz} =	1.76	in	Factored Ice Thickness (Section 2.6.8)
h =		in	Bar Grating Height
W_i =	8.22	psf	Grating Ice Weight

Wind Pressures

Pressure =	35.328	psf
Ice Pressure =	6.921	psf

Antenna Attachment Labels & Elevations (inches with Respect to Bottom of Member)

Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)	Length, in	Face	Label	Top Elev (in)	Bot Elev (in)
A					B					C	C1	77.0	42	78.0	D			
A					B					C	C2	77.0	42	78.0	D			
A					B					C	C4	93.0	28	96.0	D			
A					B					C					D			
A					B					C (2)	C1	36	36	78.0	D			
A					B					C (2)	C2	36	36	78.0	D			
A					B					C (2)	C4	30	30	96.0	D			
A					B					C (3)	C4	48	48	96.0	D			
A					B					C	C3	36	36	78.0	D			
A					B					C	C5	36	36	72.0	D			

Antennas

Item	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Antenna Attachment Locations					
								Label	Label	Label	Label	Label	Label
1	RFS CELWAVE	APL868013-42T0	48	6	8	Flat	6.32	C1	C2				
2	COMMSCOPE	(2) JAHH-65C-R3B W/ BSAMNT-SBS2-2	77	36	14.1	Flat	188.6	C4					
3	RFS CELWAVE	FD9R6004/2C-3L	5.8	6.5	1.5	Flat	3.1	C1(2)	C2(2)				
4	NOKIA	B5 4T4R RRH4X40 AIRSCALE	13	12.2	6.9	Flat	48.5	C4(2)					
5	SAMSUNG TELECOMMUNICATIONS	RFV01U-D2A	15	15	8.1	Flat	70.3	C3					
6	ALCATEL LUCENT	B13 RRH 4X30	20.9	11.8	7.5	Flat	55.6	C4(3)					
7	RFS CELWAVE	DB-T1-6Z-8AB-0Z	24	24	10	Flat	44	C5					
8													
9													
10													
11													
12													
13													
14													
15													

Dishes

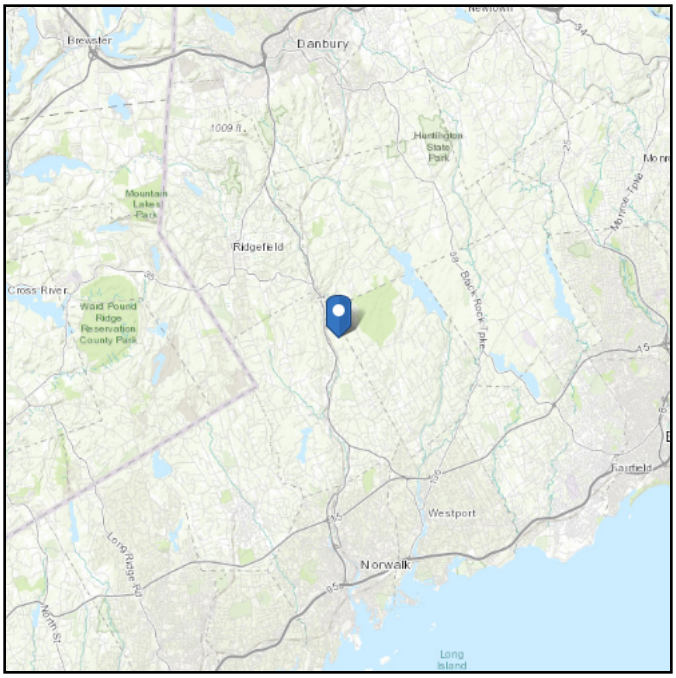
Item	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Dish Attachment Locations					
						Label	Label	Label	Label	Label	Label
1											
2											
3											
4											
5											

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 426.37 ft (NAVD 88)
Latitude: 41.238428
Longitude: -73.424011



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	91 Vmph
100-year MRI	97 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:	Mon Oct 08 2018

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

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

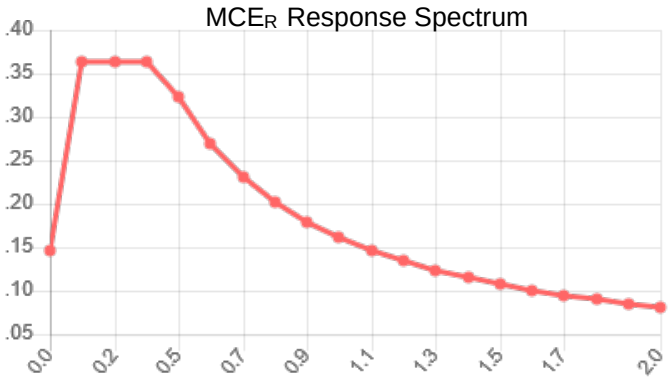
Seismic

Site Soil Class: D - Stiff Soil

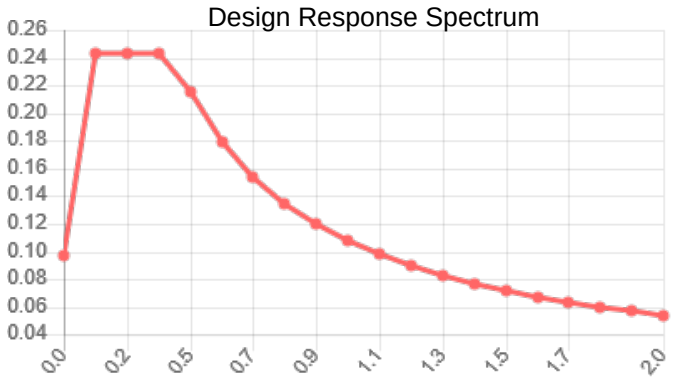
Results:

S_S :	0.227	S_{DS} :	0.243
S_1 :	0.067	S_{D1} :	0.108
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.127
S_{MS} :	0.364	PGA_M :	0.197
S_{M1} :	0.162	F_{PGA} :	1.546
		I_e :	1

Seismic Design Category B



Sa (g) vs T(s)



Sa (g) vs T(s)

Data Accessed: Mon Oct 08 2018

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

Ice

Results:

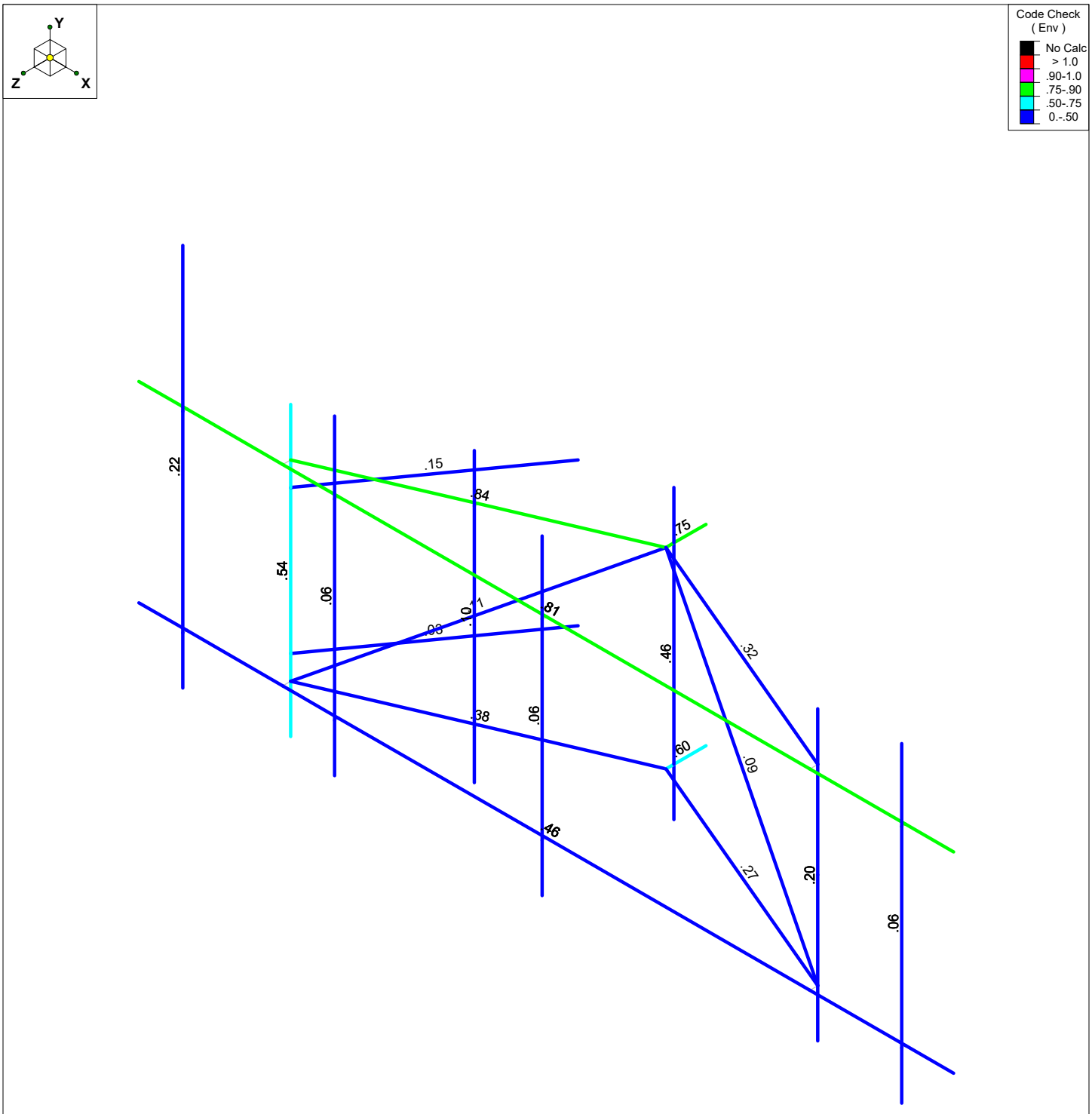
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Oct 08 2018

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

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

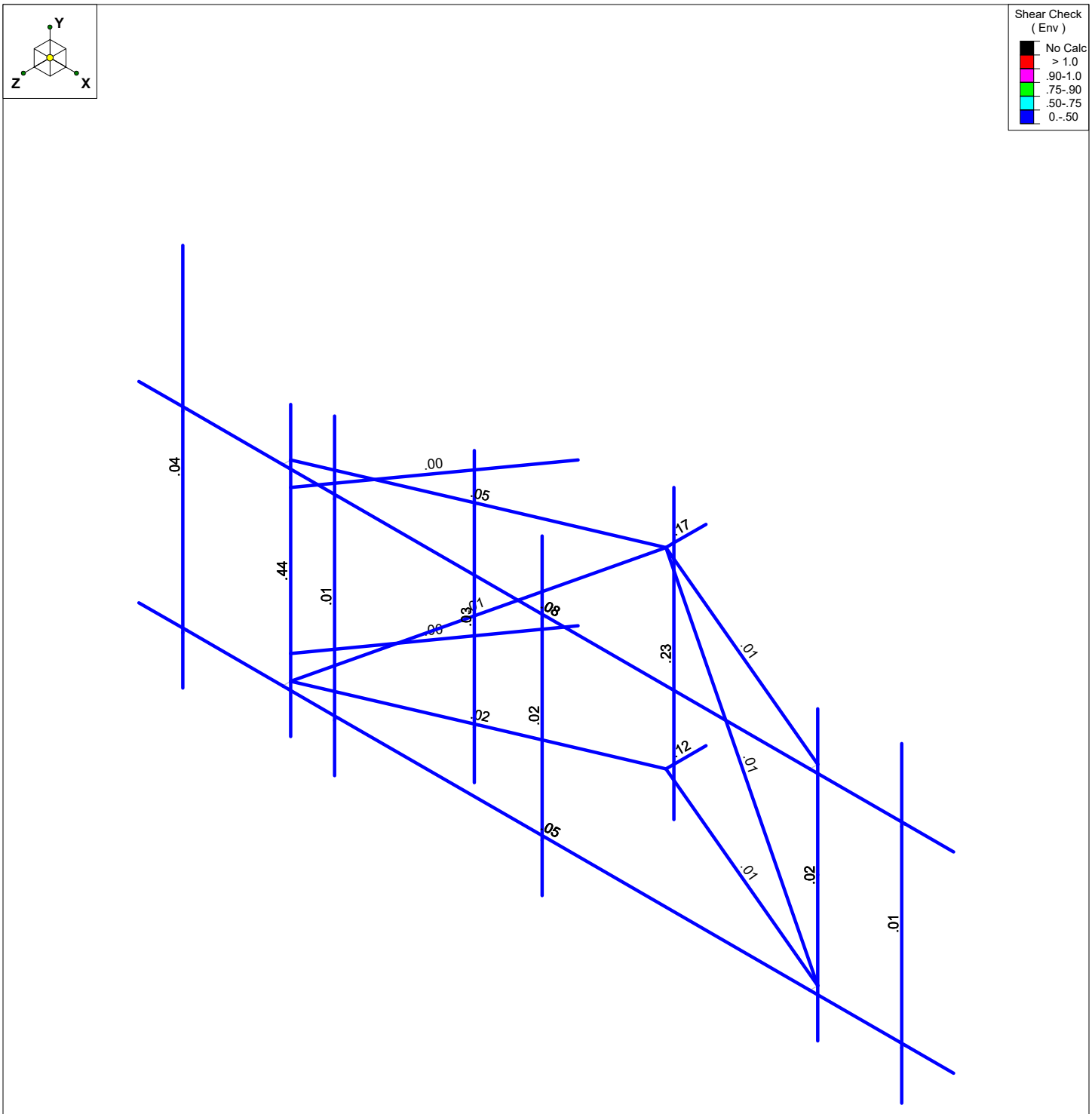
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



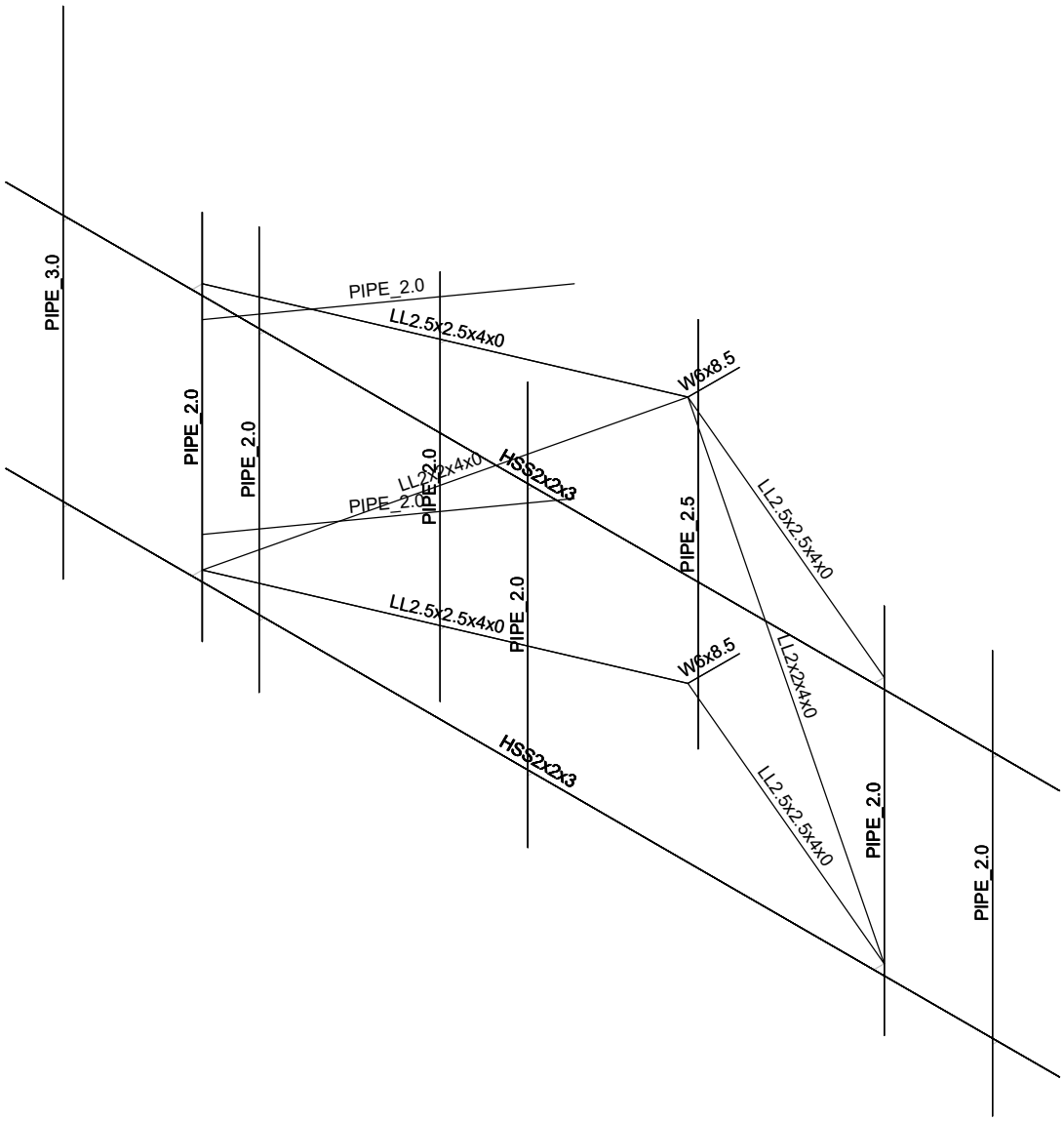
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 3
STP		Oct 16, 2018 at 3:33 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d



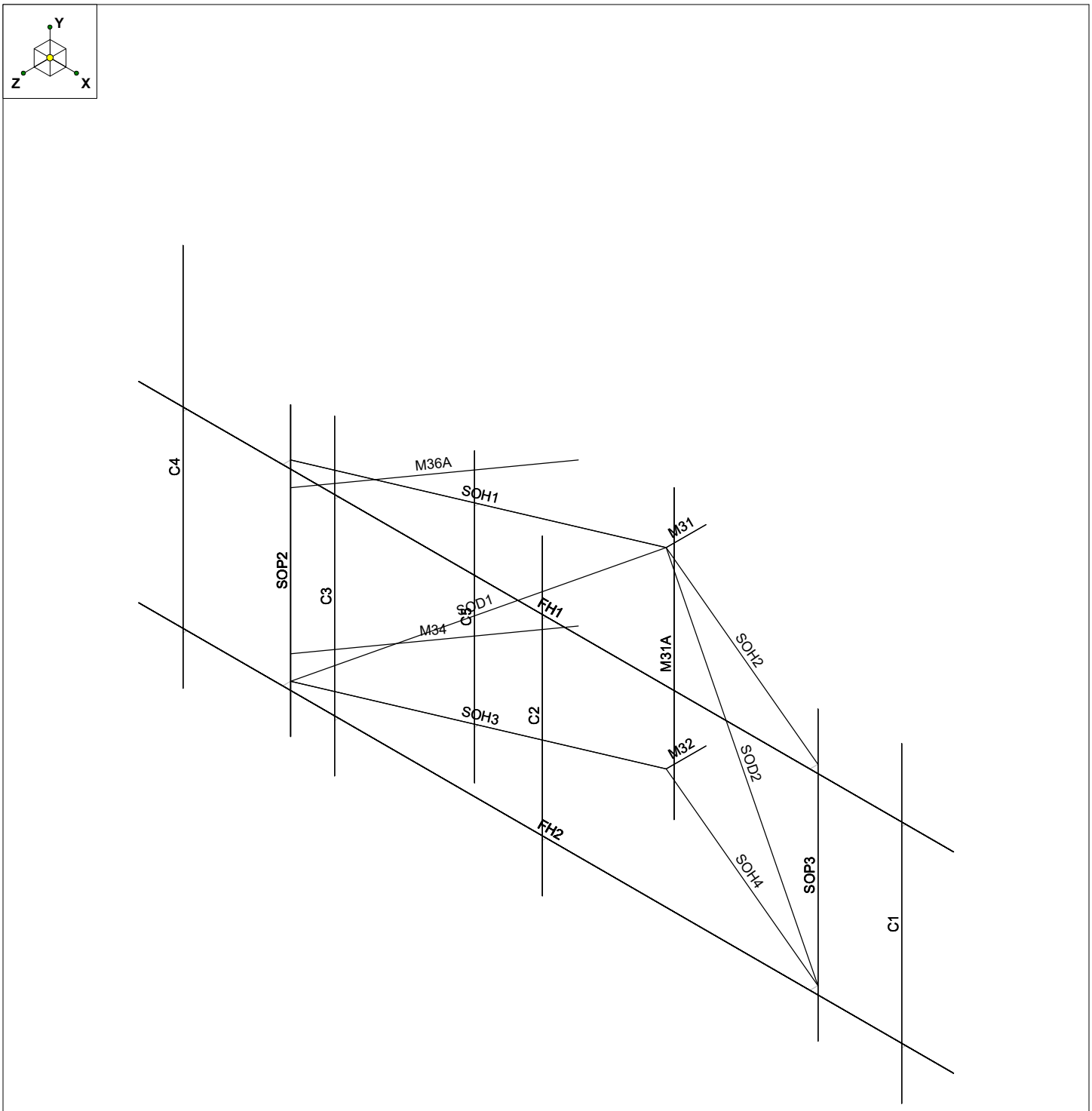
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 4
STP		Oct 16, 2018 at 3:33 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d



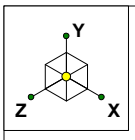
Envelope Only Solution

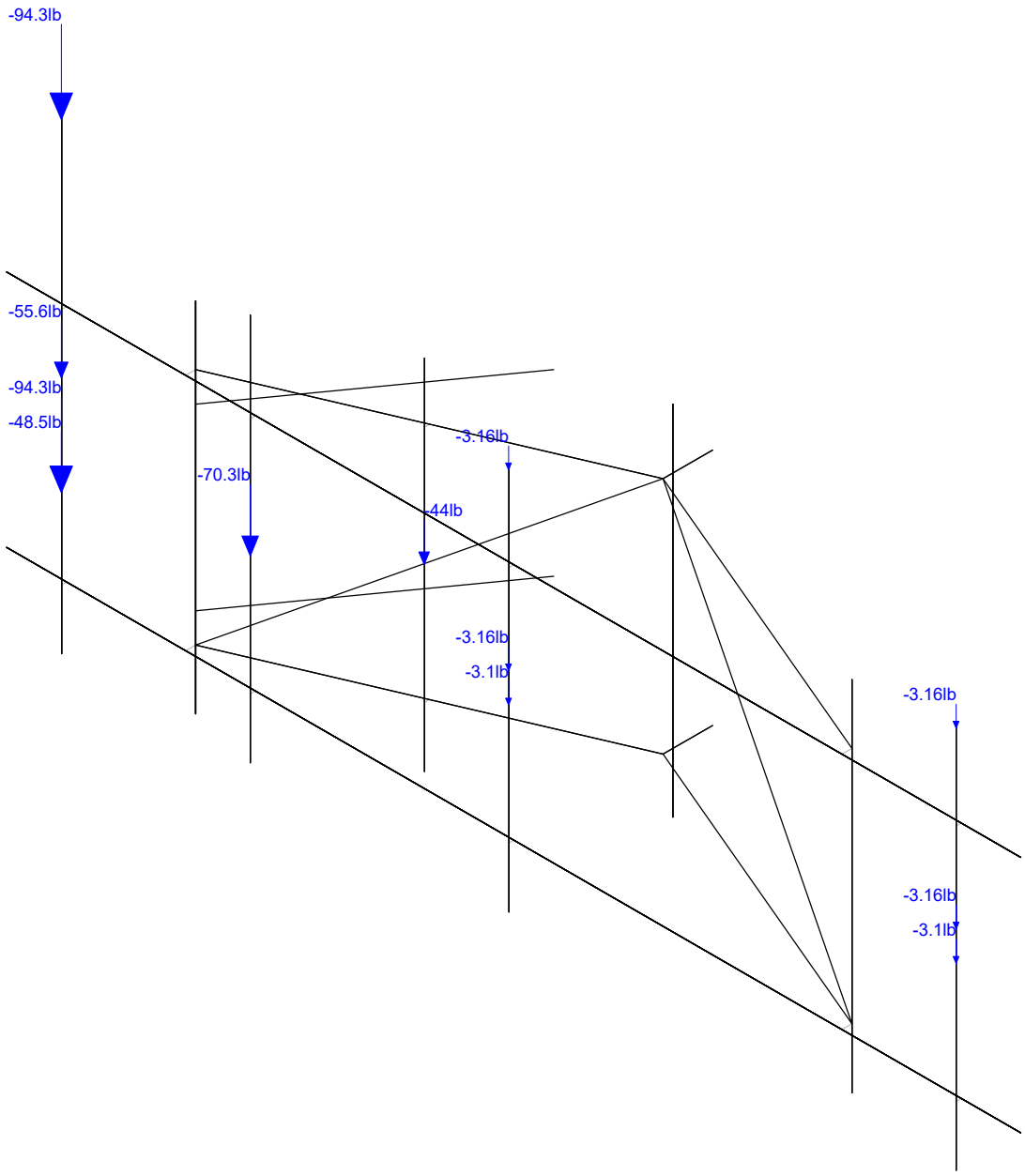
Paul J. Ford and Company	806353- BRG 124 943006	SK - 5
STP		Oct 16, 2018 at 3:33 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d



Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 6
STP		Oct 16, 2018 at 3:35 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d





Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	806353- BRG 124 943006	SK - 7
STP		Oct 16, 2018 at 3:35 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	No
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	No
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	0

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	No
Ct X	0
Ct Z	0
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	1
R Z	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A53 Gr. B (35 ksi)	29000	11154	.3	.65	.49	35	1.5	60	1.2
2	A500 Gr. B (46ksi)	29000	11154	.3	.65	.49	46	1.5	58	1.2
3	A36 (36ksi)	29000	11154	.3	.65	.49	36	1.5	58	1.2

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(de..	Section/Shape	Type	Design List	Material	Design Rules
1	C3	A5	A8			PIPE_2.0	Column	Pipe	A53 Gr. B (35 ksi)	Typical
2	FH2	B1	B2			HSS2x2x3	None	None	A500 Gr. B (46ksi)	Typical
3	FH1	B3	B4			HSS2x2x3	None	None	A500 Gr. B (46ksi)	Typical
4	M12	A3	N30			1/2"	None	None	A36 (36ksi)	Typical
5	M13	A2	N29			1/2"	None	None	A36 (36ksi)	Typical
6	M14	A7	N32			1/2"	None	None	A36 (36ksi)	Typical
7	M15	A6	N31			1/2"	None	None	A36 (36ksi)	Typical
8	C1	N25	N28			PIPE_2.0	Column	Pipe	A53 Gr. B (35 ksi)	Typical
9	M13A	N27	N34			1/2"	None	None	A36 (36ksi)	Typical
10	M14A	N26	N33			1/2"	None	None	A36 (36ksi)	Typical
11	SOP2	N49	N47			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
12	SOP3	N50	N48			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
13	M24	C2	N44			RIGID	None	None	RIGID	Typical
14	M25	C1	N43			RIGID	None	None	RIGID	Typical
15	M26	N36B	N46			RIGID	None	None	RIGID	Typical
16	M27	N35B	N45			RIGID	None	None	RIGID	Typical
17	SOH1	N40	N44			LL2.5x2.5x4x0	None	None	A36 (36ksi)	Typical
18	SOH3	N39	N43			LL2.5x2.5x4x0	None	None	A36 (36ksi)	Typical
19	SOD1	N40	N43			LL2x2x4x0	None	None	A36 (36ksi)	Typical
20	SOH2	N40	N46			LL2.5x2.5x4x0	None	None	A36 (36ksi)	Typical
21	SOH4	N39	N45			LL2.5x2.5x4x0	None	None	A36 (36ksi)	Typical
22	SOD2	N40	N45			LL2x2x4x0	None	None	A36 (36ksi)	Typical
23	C4	N51A	N52A			PIPE_3.0	Column	Pipe	A53 Gr. B (35 ksi)	Typical
24	C2	N53	N56			PIPE_2.0	Column	Pipe	A53 Gr. B (35 ksi)	Typical
25	M36	N55	N58			1/2"	None	None	A36 (36ksi)	Typical
26	M37	N54	N57			1/2"	None	None	A36 (36ksi)	Typical
27	M36A	N54A	N55A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
28	M31	N40	N53B			W6x8.5	None	None	A36 (36ksi)	Typical
29	M32	N39	N52B			W6x8.5	None	None	A36 (36ksi)	Typical
30	M31A	N42	N41			PIPE_2.5	None	None	A53 Gr. B (35 ksi)	Typical
31	M32A	N55B	N53A			RIGID	None	None	RIGID	Typical
32	M33	N56A	N54B			RIGID	None	None	RIGID	Typical
33	C5	N57A	N58A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
34	M34	N58B	N59			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	C3						Yes			None
2	FH2						Yes			None
3	FH1						Yes			None
4	M12	OOOXOX					Yes		Exclude	None
5	M13	OOOXOX					Yes		Exclude	None
6	M14	OOOXOX					Yes		Exclude	None
7	M15	OOOXOX					Yes		Exclude	None
8	C1						Yes			None
9	M13A	OOOXOX					Yes		Exclude	None
10	M14A	OOOXOX					Yes		Exclude	None
11	SOP2						Yes			None
12	SOP3						Yes			None
13	M24						Yes			None
14	M25						Yes			None
15	M26						Yes			None
16	M27						Yes			None
17	SOH1						Yes			None
18	SOH3						Yes			None
19	SOD1	BenPIN	BenPIN				Yes			None
20	SOH2						Yes			None
21	SOH4						Yes			None
22	SOD2	BenPIN	BenPIN				Yes			None
23	C4						Yes			None
24	C2						Yes			None
25	M36	OOOXOX					Yes		Exclude	None
26	M37	OOOXOX					Yes		Exclude	None
27	M36A	BenPIN					Yes			None
28	M31						Yes			None
29	M32						Yes			None
30	M31A						Yes			None
31	M32A		OOOXOX				Yes			None
32	M33		OOOXOX				Yes			None
33	C5						Yes			None
34	M34	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	C3	PIPE_2.0	78			Lbyy						Lateral
2	FH2	HSS2x2x3	204			Lbyy						Lateral
3	FH1	HSS2x2x3	204			Lbyy						Lateral
4	M12	1/2"	1			Lbyy						Lateral
5	M13	1/2"	1			Lbyy						Lateral
6	M14	1/2"	1			Lbyy						Lateral
7	M15	1/2"	1			Lbyy						Lateral
8	C1	PIPE_2.0	78			Lbyy						Lateral
9	M13A	1/2"	1			Lbyy						Lateral
10	M14A	1/2"	1			Lbyy						Lateral
11	SOP2	PIPE_2.0	72									Lateral
12	SOP3	PIPE_2.0	72									Lateral
13	SOH1	LL2.5x2.5x4...	71.694									Lateral
14	SOH3	LL2.5x2.5x4...	71.694									Lateral
15	SOD1	LL2x2x4x0	86.279									Lateral
16	SOH2	LL2.5x2.5x4...	71.694									Lateral
17	SOH4	LL2.5x2.5x4...	71.694									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
18	SOD2	LL2x2x4x0	86.279									Lateral
19	C4	PIPE_3.0	96			Lbyy						Lateral
20	C2	PIPE_2.0	78			Lbyy						Lateral
21	M36	1/2"	1			Lbyy						Lateral
22	M37	1/2"	1			Lbyy						Lateral
23	M36A	PIPE_2.0	51.614									Lateral
24	M31	W6x8.5	10			Lbyy						Lateral
25	M32	W6x8.5	10			Lbyy						Lateral
26	M31A	PIPE_2.5	72									Lateral
27	C5	PIPE_2.0	72									Lateral
28	M34	PIPE_2.0	51.614									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(Pl...
1	Dead	None		-1.1			18			
2	Live	None								
3	Wind 0	None					36	56		
4	Wind 30	None					36	56		
5	Wind 60	None					36	56		
6	Wind 90	None					36	56		
7	Wind 120	None					36	56		
8	Wind 150	None					36	56		
9	Ice Load	None					18	28		
10	Ice 0	None					36	56		
11	Ice 30	None					36	56		
12	Ice 60	None					36	56		
13	Ice 90	None					36	56		
14	Ice 120	None					36	56		
15	Ice 150	None					36	56		
16	Lm	None				1				
17	Lv	None				1				

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4 D	Yes	Y		1	1.4																		
2	1.2 D + 1.6 L	Yes	Y		1	1.2	2	1.6																
3	1.2 D + 1.0 Wo @ 0	Yes	Y		1	1.2	3	1																
4	1.2 D + 1.0 Wo @ 30	Yes	Y		1	1.2	4	1																
5	1.2 D + 1.0 Wo @ 60	Yes	Y		1	1.2	5	1																
6	1.2 D + 1.0 Wo @ 90	Yes	Y		1	1.2	6	1																
7	1.2 D + 1.0 Wo @ 120	Yes	Y		1	1.2	7	1																
8	1.2 D + 1.0 Wo @ 150	Yes	Y		1	1.2	8	1																
9	1.2 D + 1.0 Wo @ 180	Yes	Y		1	1.2	3	-1																
10	1.2 D + 1.0 Wo @ 210	Yes	Y		1	1.2	4	-1																
11	1.2 D + 1.0 Wo @ 240	Yes	Y		1	1.2	5	-1																
12	1.2 D + 1.0 Wo @ 270	Yes	Y		1	1.2	6	-1																
13	1.2 D + 1.0 Wo @ 300	Yes	Y		1	1.2	7	-1																
14	1.2 D + 1.0 Wo @ 330	Yes	Y		1	1.2	8	-1																
15	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	10	1														
16	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	11	1														
17	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	12	1														
18	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	13	1														
19	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	14	1														
20	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	15	1														

Load Combinations (Continued)

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
21	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	12	-1																
24	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	14	-1																
26	1.2 D + 1.0 Di + 1.0 ...	Yes	Y		1	1.2	9	1	15	-1																
27	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	3	.063	16	1.5																
28	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	4	.063	16	1.5																
29	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	5	.063	16	1.5																
30	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	6	.063	16	1.5																
31	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	7	.063	16	1.5																
32	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	8	.063	16	1.5																
33	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	3	-.063	16	1.5																
34	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	4	-.063	16	1.5																
35	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	5	-.063	16	1.5																
36	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	6	-.063	16	1.5																
37	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	7	-.063	16	1.5																
38	1.2 D + 1.5 Lm + 1.0 ...	Yes	Y		1	1.2	8	-.063	16	1.5																
39	1.2 D + 1.5 Lv	Yes	Y		1	1.2	17	1.5																		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N55A	max	1957.711	8	30.235	20	3188.873	14	0	1	0	1	0	1
2		min	-2282.985	14	-.873	14	-2785.096	8	0	1	0	1	0	1
3	N52B	max	670.164	37	2301.312	20	3562.367	16	0	1	0	1	0	1
4		min	-3042.993	19	771.315	14	321.482	11	0	1	0	1	0	1
5	N53B	max	4113.878	13	1635.19	26	290.236	5	0	1	0	1	0	1
6		min	-2018.57	7	521.135	8	-3682.881	23	0	1	0	1	0	1
7	N59	max	612.997	7	32.949	19	479.754	13	0	1	0	1	0	1
8		min	-323.103	13	8.297	13	-892.709	7	0	1	0	1	0	1
9	Totals:	max	2161.463	13	3964.802	20	2885.549	3						
10		min	-2161.46	7	1418.729	14	-2885.533	9						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	SOH1	LL2.5x2.5...	.836	71.694	8	.045	71.694	z	14	48355....	77112	4440.96	2082.7...	2...	H1-1b
2	FH1	HSS2x2x3	.812	34	4	.079	34	z	9	3479.6...	49266	2749.65	2749.65	3...	H1-1b
3	M31	W6x8.5	.754	0	13	.172	1.979	y	20	81105....	81648	4212	15471	1...	H1-1b
4	M32	W6x8.5	.599	2.083	19	.119	1.979	z	17	81105....	81648	4212	15471	1...	H1-1b
5	SOP2	PIPE_2.0	.541	60	14	.435	54		14	20866....	32130	1871.6...	1871.6...	3...	H1-1b
6	M31A	PIPE_2.5	.463	60	26	.232	12		25	37773....	50715	3596.25	3596.25	1...	H1-1b
7	FH2	HSS2x2x3	.460	34	16	.051	34	y	20	3479.6...	49266	2749.65	2749.65	3...	H1-1b
8	SOH3	LL2.5x2.5...	.377	71.694	14	.023	71.694	y	26	48355....	77112	4440.96	2082.7...	1...	H1-1b
9	SOH2	LL2.5x2.5...	.318	0	13	.013	0	z	14	48355....	77112	4440.96	3332.3...	1...	H1-1b
10	SOH4	LL2.5x2.5...	.274	0	20	.012	0	z	8	48355....	77112	4440.96	3332.3...	1...	H1-1b
11	C4	PIPE_3.0	.221	60	10	.042	60		8	46290....	65205	5748.75	5748.75	1...	H1-1b
12	SOP3	PIPE_2.0	.196	12	38	.021	12		8	20866....	32130	1871.6...	1871.6...	1...	H1-1b
13	M36A	PIPE_2.0	.152	51.614	14	.003	0		25	25738....	32130	1871.6...	1871.6...	1...	H1-1b*
14	SOD1	LL2x2x4x0	.110	43.139	19	.012	86.279	y	19	21000....	61236	2894.4	2114.1...	1...	H1-1b
15	C5	PIPE_2.0	.103	36	10	.028	12		14	20866....	32130	1871.6...	1871.6...	1...	H1-1b
16	SOD2	LL2x2x4x0	.088	43.139	23	.008	86.279	y	25	21000....	61236	2894.4	2114.1...	1...	H1-1b
17	C3	PIPE_2.0	.064	35.75	8	.011	12.188		14	19360....	32130	1871.6...	1871.6...	1...	H1-1b
18	C1	PIPE_2.0	.063	60.125	11	.014	59.313		5	19360....	32130	1871.6...	1871.6...	2...	H1-1b
19	C2	PIPE_2.0	.063	60.125	13	.017	59.313		13	19360....	32130	1871.6...	1871.6...	2...	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
20	M34	PIPE_2.0	.032	25.807	19	.003	0		19	25738....	32130	1871.6...	1871.6...	1...	H1-1b

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Project # A37518-3356.002.8190
By STP

v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS

Px=	3.04	Kip
Py=	2.3	Kip
(Axial)Pz=	3.56	Kip
Mx=	0	Kip-in
My=	0	Kip-in
(Torque)Mz=	0	Kip-in

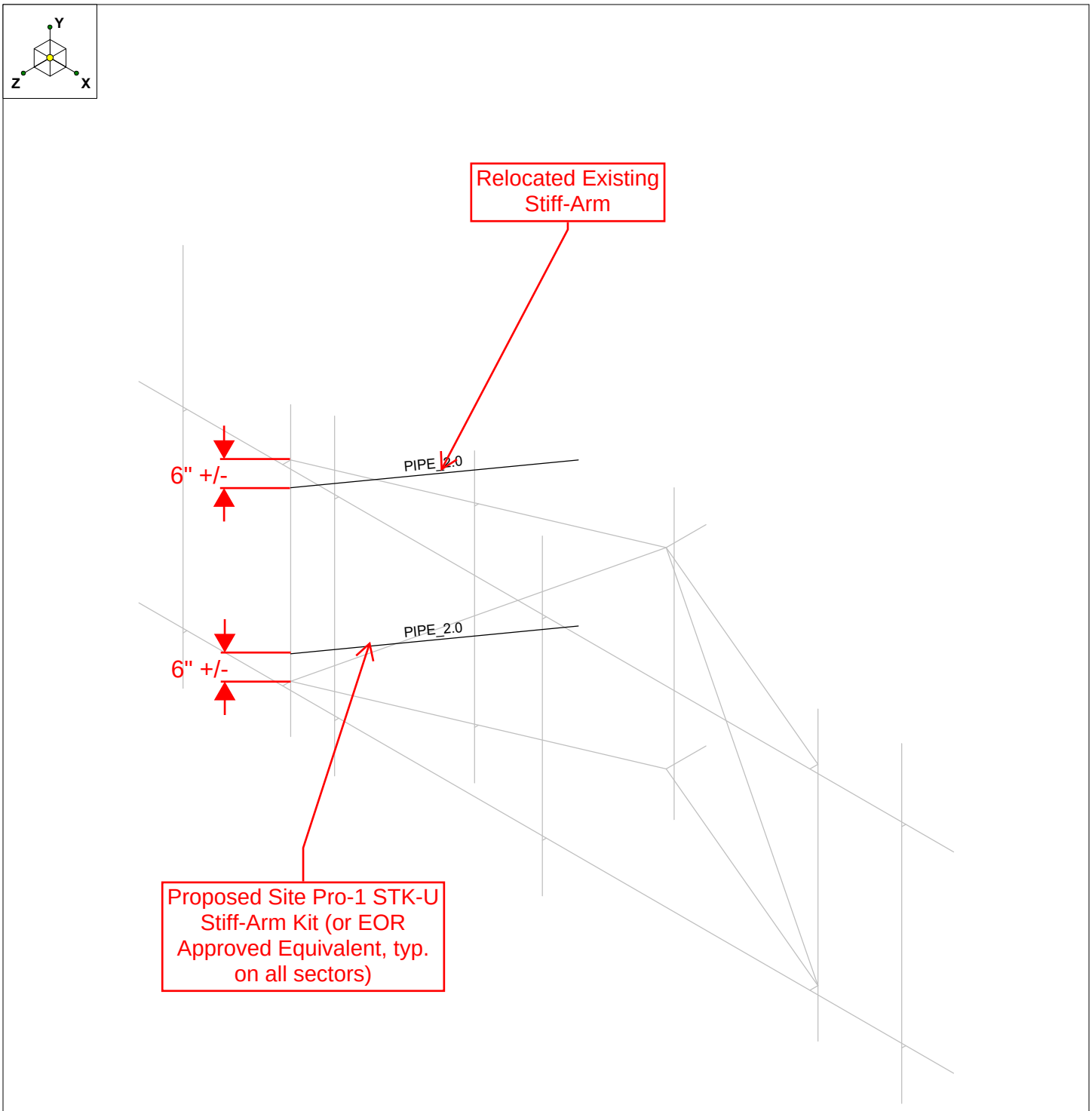
Number of Bolts = 4

BOLT CHECKS

Tension Reaction	0.89	kip
Shear Reaction	0.95	kip
Bolt Type	U-Bolt	
Bolt Diameter	0.5	in
Tensile Strength	16.3	kips
Shear Strength	9.8	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	5.4%	**Note: Tension reduction not required if tension or shear capacity < 30%**
Shear Capacity Used	9.7%	

APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION



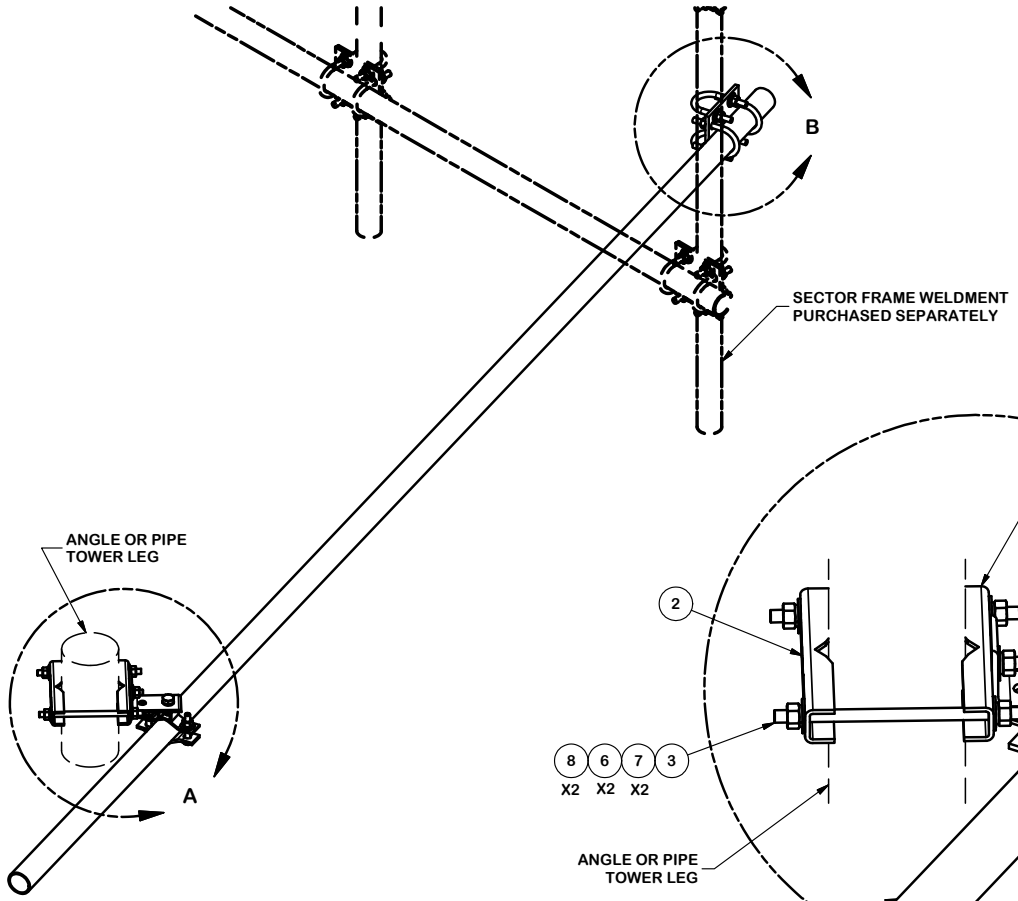
Loads: BLC 1, Dead
Envelope Only Solution

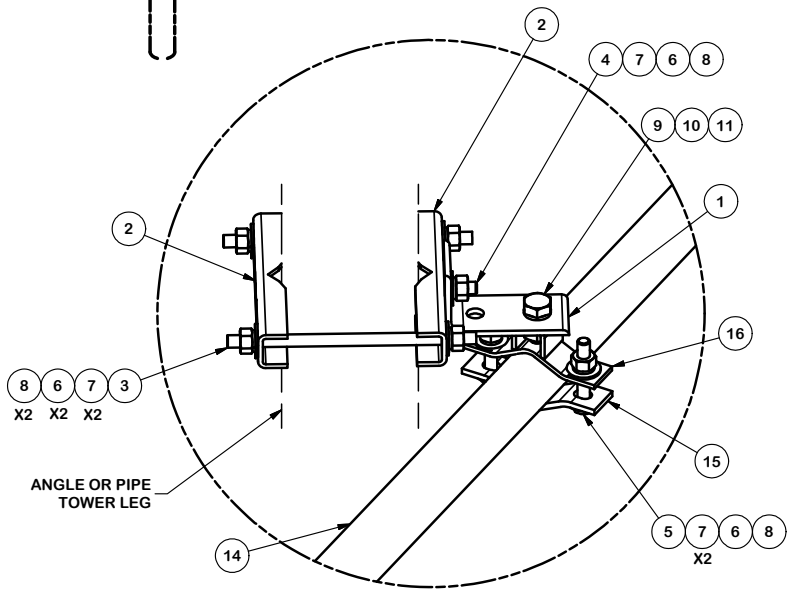
Paul J. Ford and Company	806353- BRG 124 943006	SK - 8
STP		Oct 16, 2018 at 3:36 PM
37518-3356.002.8190		37518-3356_Wind Load.r3d

APPENDIX E

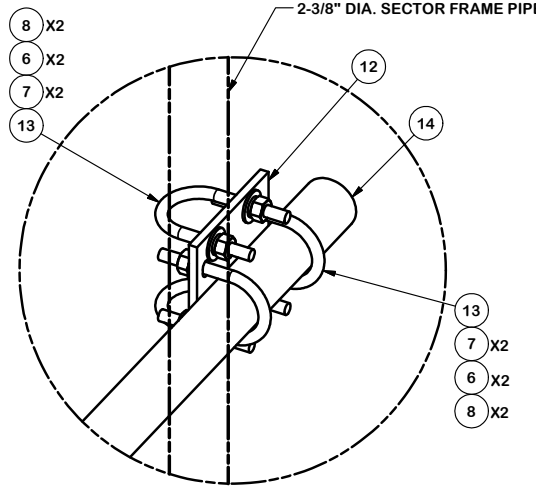
MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-STA3	STIFF ARM ANGLE BRACKET	2 1/2 in	1.39	1.39
2	2	X-STU	STIFF ARM CHANNEL BRACKET		1.37	2.74
3	2	G12R-10	1/2" x 10" THREADED ROD (HDG.)		3.23	6.45
4	1	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1 1/2 in	0.15	0.15
5	2	G1203	1/2" x 3" HDG HEX BOLT GR5 FULL THREAD	3 in	0.22	0.43
6	15	G12LW	1/2" HDG LOCKWASHER		0.01	0.21
7	17	G12FW	1/2" HDG USS FLATWASHER		0.03	0.58
8	15	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.07
9	1	G58112	5/8" x 1-1/2" HDG BOLT	1 1/2 in	0.25	0.25
10	1	G58LW	5/8" HDG LOCKWASHER		0.03	0.03
11	1	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.13
12	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
13	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.66	2.63
14	1	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	48.06
15	1	ACP	4-1/16" CLAMP HALF, 1/4" THK.		0.65	0.65
16	1	SAM	STIFF ARM MOUNT CLAMP		0.77	0.77
					TOTAL WT. #	63.79





DETAIL A



DETAIL B

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION: SECTOR FRAME STIFF ARM KIT

SITE PRO 1 — A valmont COMPANY

Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4647	KC8 8/16/2012		STK-U	1 OF 1
CLASS / SUB: 81 / 02	DRAWING USAGE: CUSTOMER	CHECKED BY: CEK 2/18/2013	DWG. NO.: STK-U	

Site Name: Wilton, CT

Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	1	6749	6749	162	0.0925	1.0	9.25%
VZW Cellular	869	3	252	756	162	0.0104	0.579333333	1.79%
VZW Cellular	880	1	3709	3709	162	0.0508	0.586666667	8.66%
VZW AWS	2145	1	7400	7400	162	0.1014	1.0	10.14%
VZW 700	746	1	2062	2062	162	0.0283	0.497333333	5.68%

Total Percentage of Maximum Permissible Exposure 35.52%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Section 1.13101 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used, including the following assumptions:
1. closest accessible point is distance from antenna to base of pole;
2. continuous transmission from all available channels at full power for indefinite time period; and,
3. all RF energy is assumed to be directed solely to the base of the pole.