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

July 17, 2020

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

RE: **Notice of Exempt Modification for T-Mobile:**
823666 - T-Mobile Site ID: CT11237C
15 Pent Road, Deep River, CT 06417
Latitude: 41° 22′ 22.17″ / Longitude: -72° 26′ 3.97″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 178-foot mount on the existing 178-foot Monopole Tower, located at 15 Pent Road, Deep River, CT. The tower is owned by Crown Castle and the property is owned by Beks Holdings LLC. T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700/1900/2100 MHz antennas. The new antennas will be installed at the 178-ft level of the tower. T-Mobile is also proposing tower mount modifications, as shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove and Replace:
(3) LNX 6515DS-VTM Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700/1900/2100 MHz **(REPLACE)**

Install New:
(3) TMA
(3) Radio 4449 B71/B12
(1) 1 5/8" Hybrid Fiber Line

Existing to Remain:
(12) 1 5/8" Coax
(1) Fiber line
(3) EMS RR90-17-02DP Antenna (Dormant)
(3) TMA

Ground:
Upgrade to existing ground cabinet. (Internally)

The facility was likely approved by the Town of Deep River Planning and Zoning Commission during the year 2000, as the site went on air on November 30, 2000. Diligent efforts went into attempting to obtain the original facility approval for this telecommunications facility. Search efforts were made throughout all Crown Castle files without success. Efforts were also made on the part of Deep River's Zoning Department

to try and locate the original approval though that was unsuccessful as well. The Land Records held by the Town of Deep River's Town Clerk did not provide for the original recording of the Special Permit either. To date, the original building permit issued to Voice Stream Wireless dated August 18, 2000, permit no. 00-1-182, for the purposes of constructing an antenna tower, is all that could be located. This is the most legible we could make the copy of the building permit. Should the original Special Permit for this facility become available, we will make it available to the Council as a supplemental part of this filing.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Angus L. McDonald, Jr., First Selectman for the Town of Deep River, Michael D'Amato, Zoning Enforcement Officer, Crown Castle as the tower owner, and Beks Holdings LLC, the property owner.

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

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

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

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

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

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

Sincerely,

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

Angus L. McDonald, Jr., First Selectman (*via email only to amcdonald@deepriverct.us*)
Town of Deep River
Town Hall – Selectman's Office
174 Main Street
Deep River, CT 06417
860-526-6020

Michael D'Amato, Zoning Enforcement Officer (*via email only to zoning@deepriverct.us*)
Planning & Zoning Office
Town of Deep River
174 Main Street
Deep River, CT 06417
860-526-6020

Beks Holdings LLC, Property Owner
14 Timberlane Drive
Westbrook, CT 06498

Crown Castle, Tower Owner

ORIGIN ID:SCHA (518) 350-3639
ANNE MARIE ZSAMBA
CROWN CASTLE
21 HEATHER DRIVE
GANSEVOORT, NY 12831
UNITED STATES US

SHIP DATE: 14JUL20
ACTWGT: 1.00 LB
CAD: 104924194/INET4220

BILL SENDER

TO **BEKS HOLDINGS LLC**
14 TIMBERLANE DRIVE
WESTBROOK CT 06498
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

56BJ3/C6A6/FE4A

FedEx Express

J201120042401uv

TRK# 0201 **7709 4525 7971**

WED - 15 JUL 12:00P
PRIORITY OVERNIGHT

EB RSPA

06498
CT-US **BDL**

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

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

From: Zsamba, Anne Marie
To: amcdonald@deepriverct.us
Subject: Notice of Exempt Modification - 15 Pent Road - T-Mobile
Date: Friday, July 17, 2020 8:44:00 AM
Attachments: EM-T-MOBILE-15 PENT RD DEEP RIVER-823666-CT11237C_notice.pdf

---

Dear First Selectman McDonald:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council, today July 17, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: zoning@deepriverct.us
Subject: Notice of Exempt Modification - 15 Pent Road - T-Mobile
Date: Friday, July 17, 2020 8:44:00 AM
Attachments: EM-T-MOBILE-15 PENT RD DEEP RIVER-823666-CT11237C_notice.pdf

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Dear ZEO D'Amato:

First and foremost, thank you for your efforts in trying to locate the original facility approval here. You'll note in the cover letter, that I will supplement this filing if you are able to find same. I was able to locate a copy of the original building permit which I've included in this filing.

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council, today July 17, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

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CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

CT-11-237C

BUILDING PERMIT

JOB WEATHER CARD

DATE AUGUST 18, 2000 PERMIT NO. 00-1-182

APPLICANT VOICE STREAM WIRELESS ADDRESS 109 FILLEY, WINDSOR, CT. 06095
(NO.) (STREET) (CONTR'S LICENSE)

PERMIT TO CONSTRUCT ANTENNA TOWER STORY NUMBER OF DWELLING UNITS 0
(TYPE OF IMPROVEMENT) NO. (PROPOSED USE)

AT (LOCATION) 19 PEET ROAD, DEEP RIVER ZONING DISTRICT
(NO.) (STREET)

BETWEEN (CROSS STREET) AND (CROSS STREET)

SUBDIVISION LOT BLOCK LOT SIZE

BUILDING IS TO BE FT. WIDE BY FT. LONG BY FT. IN HEIGHT AND SHALL CONFORM IN CONSTRUCTION

TO TYPE USE GROUP BASEMENT WALLS OR FOUNDATION
(TYPE)

REMARKS: PERMIT ISSUED FOR THE CONSTRUCTION OF TOWER PER SUBMITTED APPLICATION AND DRAWINGS. ALL APPLICABLE CODES MUST BE MET AND INSPECTIONS REQUESTED. FIRST INSPECTION REQUIRED PRIOR TO POURING ANY CONCRETE.
CONTRACTOR: COSTANTIA CONST. 2534 RUSDALE AVE., OCEANSIDE, NY 11572

AREA OR VOLUME (CUBIC/SQUARE FEET) ESTIMATED COST $ 15,000.00 PERMIT FEE $ 240.00

OWNER ROBERT STALSBURG

ADDRESS 19 PEET ROAD, DEEP RIVER BUILDING DEPT. BY

FORM NO. BOCA 1 BP 1994

THIS PERMIT CONVEYS NO RIGHT TO OCCUPY ANY STREET, ALLEY OR SIDEWALK OR ANY PART THEREOF, EITHER TEMPORARILY OR PERMANENTLY. ENCROACHMENTS ON PUBLIC PROPERTY, NOT SPECIFICALLY PERMITTED UNDER THE BUILDING CODE, MUST BE APPROVED BY THE JURISDICTION. STREET OR ALLEY GRADES AS WELL AS DEPTH AND LOCATION OF PUBLIC SEWERS MAY BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS. THE ISSUANCE OF THIS PERMIT DOES NOT RELEASE THE APPLICANT FROM THE CONDITIONS OF ANY APPLICABLE SUBDIVISION RESTRICTIONS.

MINIMUM OF THREE CALLED INSPECTIONS REQUIRED FOR ALL CONSTRUCTION WORK:
1. FOUNDATIONS OR FOOTINGS.
2. PRIOR TO COVERING STRUCTURAL MEMBERS (READY FOR LATH OR FINISH COVERING).
3. FINAL INSPECTION BEFORE OCCUPANCY.

APPROVED PLANS MUST BE RETAINED ON JOB AND THIS CARD KEPT POSTED UNTIL FINAL INSPECTION HAS BEEN MADE. WHERE A CERTIFICATE OF OCCUPANCY IS REQUIRED, SUCH BUILDING SHALL NOT BE OCCUPIED UNTIL FINAL INSPECTION HAS BEEN MADE.

WHERE APPLICABLE SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING AND MECHANICAL INSTALLATIONS.

POST THIS CARD SO IT IS VISIBLE FROM STREET

BUILDING INSPECTION APPROVALS	PLUMBING INSPECTION APPROVALS	ELECTRICAL INSPECTION APPROVALS
1	1	1
2	2	2
3	HEATING INSPECTING APPROVALS	REFRIGERATION INSPECTION APPROVALS
	1	1
OTHER	2	2

WORK SHALL NOT PROCEED UNTIL THE INSPECTOR HAS APPROVED THE VARIOUS STAGES OF CONSTRUCTION.

PERMIT WILL BECOME NULL AND VOID IF CONSTRUCTION WORK IS NOT STARTED WITHIN SIX MONTHS OF DATE THE PERMIT IS ISSUED AS NOTED ABOVE.

INSPECTIONS INDICATED ON THIS CARD CAN BE ARRANGED FOR BY TELEPHONE OR WRITTEN NOTIFICATION.

From: Zoning
To: Zsamba, Anne Marie
Subject: RE: Seeking Original Telecom Tower Approval - 15 Pent Road - 823666
Date: Wednesday, July 15, 2020 11:08:00 AM
Attachments: image001.png
image002.png

Hi Anne Marie

I'll see what I can come up with, I'm not sure how far I'll get. If I'm able to find a copy of the original permit I will let you know.

Thanks,

Mike

John Guszkowski, AICP, ENV-SP, LEED
Mike D'Amato, CZEO, AICP
Co-Interim Zoning Officers
Town of Deep River, CT

From: Zsamba, Anne Marie [mailto:AnneMarie.Zsamba@crowncastle.com]
Sent: Wednesday, July 15, 2020 9:56 AM
To: Zoning
Subject: RE: Seeking Original Telecom Tower Approval - 15 Pent Road - 823666

Hi Mike,

I appreciate your response in light of you both getting up to speed – thank you!

I've searched through the land records and have spoken with Amy and came up short. Below are snips are my searches. The tower was put up by T-Mobile. T-Mobile was originally Omnipoint/VoiceStream back in the day. The fee owner and original lessor was Robert R. Stalsburg. Here is what I was able to find:

Search Results for Town of Deep River

Click the magnifying glass to preview the document (displayed at the bottom of the screen).

Result Matches: [1 - 3 of 3]

Preview	Name	File Date	Party	Number	Type Desc.	Inst. Date	# Pgs.	Vol/Page
	OMNIPOINT COMMUNICATIONS INC	03/11/2002 00:00:00	Direct	1670072	LEASE	01/01/1900	8	00167/72
	OMNIPOINT COMMUNICATIONS INC	12/01/2000 00:00:00	Indirect	1590450	LEASE	01/01/1900	3	00159/450
	OMNIPOINT COMMUNICATIONS INC	12/01/2000 00:00:00	Grantor	1590453	EASEMENT	01/01/1900	5	00159/453

"VoiceStream" returns "0" results. I also searched "Voice" "Stream" "VoiceS" "Omni".

Robert R. Stalsburg returns many hits. One of which reads as a special permit, though it was after the tower was built and was granted for the collocation of Verizon's antennas after T-Mobile was already on the tower. I've paid for and attached a copy of that Special Permit to this email for ease of reference. The permit notes the address as 366 Main Street, Map 58, Lot 32F. We now refer to the premises as 15 Pent Road, Map 58, Lot 34. Not sure if that will impact your search at all?

	STALSBURG ROBERT R	03/22/2002 00:00:00	Grantee	1670280	RELEASE	01/01/1900	1	00167/280
	STALSBURG ROBERT R	02/05/2002 00:00:00	Direct	1660540	SPECIAL PERMIT	01/01/1900	4	00166/540
	STALSBURG ROBERT R	12/01/2000 00:00:00	Grantor	1590453	EASEMENT	01/01/1900	5	00159/453

I don't believe the original tower approval, likely dated 2000 or 2001, was recorded. Any effort you can spare to look at the PZC files to ascertain if the original tower approval can be located is much appreciated.

Thank you.

Best,
Anne Marie

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zoning <Zoning@deepriverct.us>
Sent: Wednesday, July 15, 2020 9:05 AM
To: Zsamba, Anne Marie <AnneMarie.Zsamba@crowncastle.com>
Subject: RE: Seeking Original Telecom Tower Approval - 15 Pent Road - 823666

Hi Anne Marie

Thanks for the email. John and I are just getting caught up to speed in Deep River, but my understanding is that if this project was approved by the Commission, those files are maintained by the Commission's secretary and they are not here in the zoning office. That being said, I did go through the building file but didn't have any luck. It is likely that once the project was approved by the Town, the certificate of approval was filed on the land records. You should be able to access the Town Clerk's records via her website online. If you don't have any luck there I can attempt to look through the PZC files, but I'll need to know the year the Tower was approved (or built) if possible.

Let me know.

Thanks,

Mike

John Guszkowski, AICP, ENV-SP, LEED
Mike D'Amato, CZEO, AICP
Co-Interim Zoning Officers
Town of Deep River, CT

From: Zsamba, Anne Marie [mailto:AnneMarie.Zsamba@crowncastle.com]
Sent: Tuesday, July 14, 2020 2:11 PM
To: Zoning
Subject: Seeking Original Telecom Tower Approval - 15 Pent Road - 823666

Good afternoon Mike & John,

Seeking your assistance if possible. This email follows my voicemail of earlier this morning. I am preparing an exempt modification application for submission to the Connecticut Siting Council on behalf of T-Mobile. Part of that submission should include the original tower approval as issued by the Town of Deep River so as to ensure the modification T-Mobile is proposing are not in violation of any conditions of approval written when the tower was first approved prior to it originally being built.

I have searched high and low through our files here at Crown as the tower owner and I unfortunately cannot locate it. Is this something the Town of Deep River would still have on file? If so, would it be possible to email me a copy?

Any assistance you can provide in this regard is appreciated. We want to make sure we are complying with any and all conditions as original set forth by the Town. Thank you kindly.

Best,
Anne Marie

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

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VOL. 166 PAGE 540

SPECIAL PERMIT NOTICE

You are hereby notified that on January 17. 2002 the Planning and Zoning Commission of the Town of Deep River granted your application for amendment to an approved special permit, effective February 14, 2002, as follows:

1. **Owner of Record**: Robert R. Stalsburg and Grace Stalsburg
   Applicant: Cellco Partnership d/b/a Verizon Wireless
   99 East River Drive, East Hartford, CT 06108

2. **Description of Premises**: 366 Main Street
   Map 58, Lot 32F as identified by the Tax Assessor for the Town of Deep River

3. **Applicable Zoning Regulations**: Section 7.14 of the Deep River Zoning Regulations

4. **Nature of Special Permit**:
   Amendment to Special Permit of VoiceStream Wireless for purpose of attachment of 12 panel-type antennas on a triangular antenna platform at the 170 foot level of the existing 180 foot tower. Equipment associated with the Cellco antennas will be located in a new 12 ft. by 30 ft. equipment shelter located near the base of the tower within the existing fenced compound. The approval is in accordance with plans entitled: "Enlarged Site Plan and Grading Plan, Tower Elevation and Erosion Control Notes, and Detail Sheet, Cellco Partnership dba Verizon Wireless Deep River Telecommunication Facility 366 Main Street Deep River, Connecticut 06417 Scale1" = 10' Date: 12/4/2001" prepared by BL Companies, 355 Research Parkway, Meriden, Connecticut 06450.
   See Statement of Use attached hereto and made a part hereof.

5. **Conditions**: None

6. **Reasons**: Meets the conditions set forth in the Deep River Zoning Regulations.

TOWN OF DEEP RIVER
PLANNING AND ZONING COMMISSION

By _____
Jonathan Kastner, Its Secretary

CERTIFICATION

This is to certify that the foregoing is a true copy of a special permit issued by the Deep River Planning and Zoning Commission on January 17, 2002.

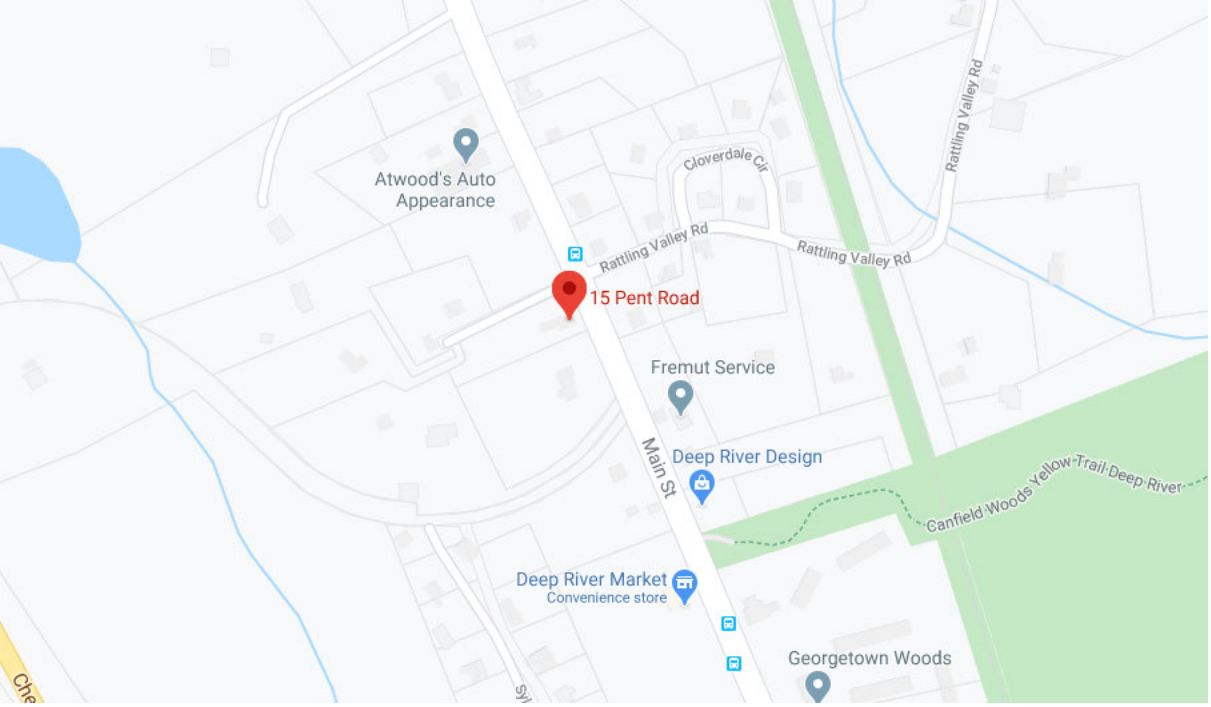
TOWN OF DEEP RIVER
PLANNING AND ZONING COMMISSION

By _____
Jonathan Kastner, Its Secretary

NOTICE: **FOR THIS SPECIAL PERMIT TO BE EFFECTIVE, YOU MUST RECORD THIS CERTIFIED COPY ON THE DEEP RIVER LAND RECORDS IN THE DEEP RIVER TOWN CLERK'S OFFICE, WITHIN SIXTY (60) DAYS OR PERMIT BECOMES NULL AND VOID.**

Exhibit B

Property Card


Atwood's Auto Appearance
Cloverdale Cir
Rattling Valley Rd
Rattling Valley Rd
Rattling Valley Rd
15 Pent Road
Fremut Service
Main St
Deep River Design
Canfield Woods Yellow Trail Deep River
Deep River Market
Convenience store
Georgetown Woods

15 PENT RD

Location	15 PENT RD	**Mblu**	58/ / 34/ /
Acct#	00155800	**Owner**	BEKS HOLDINGS LLC
Assessment	$296,520	**Appraisal**	$423,600
PID	1745	**Building Count**	2

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$291,000	$132,600	$423,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$203,700	$92,820	$296,520

Parcel Addreses

Additional Addresses
No Additional Addresses available for this parcel

Owner of Record

Owner	BEKS HOLDINGS LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	14 TIMBERLANE DR WESTBROOK, CT 06498	**Book & Page**	0245/0035
		Sale Date	09/30/2019
		Instrument	29

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
BEKS HOLDINGS LLC	$0		0245/0035	29	09/30/2019
STALSBURG ROBERT R JR & SHERI L TRUSTEES	$0		0239/0150	29	09/29/2017
STALSBURG ROBERT R JR	$0		0187/0502	29	07/12/2004
STALSBURG ROBERT R JR & GRACE A	$0		0184/0720	29	03/01/2004

Building Information

Building 1 : Section 1

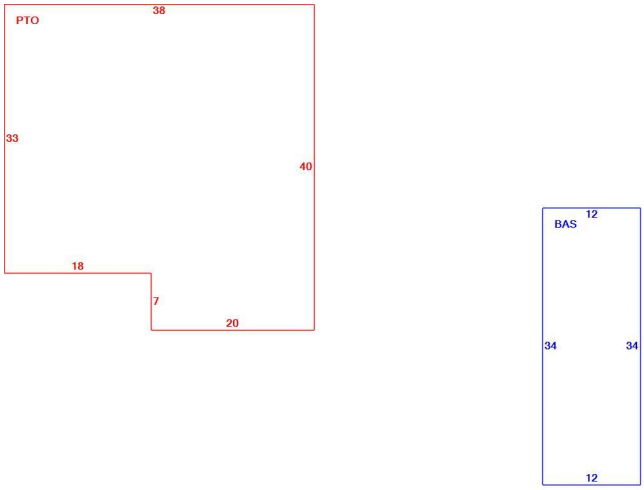
Year Built: 1948
Living Area: 408

Building Attributes	
Field	**Description**
STYLE	Warehouse
MODEL	Ind or Comm
Grade	Average
Stories:	1
Occupancy	1.00
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Minim/Masonry
Interior Wall 2	Cust Wd Panel
Interior Floor 1	Concr-Finished
Interior Floor 2	Carpet
Heating Fuel	None
Heating Type	None
AC Type	None
Struct Class	
Bldg Use	COMM WHSE
Total Rooms	
Total Bedrms	00
Total Baths	0
Usrfld 218	
Usrfld 219	
1st Floor Use:	3160
Heat/AC	NONE
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEILING ONLY
Rooms/Prtns	AVERAGE
Wall Height	12.00
% Comn Wall	0.00

Building Photo

(http://images.vgsi.com/photos/DeepRiverCTPhotos//\00\00\63\63.jpg)

Building Layout



(ParcelSketch.ashx?pid=1745&bid=1745)

Building Sub-Areas (sq ft)			
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	408	408
PTO	Patio	1,394	0
		1,802	408

Building 2 : Section 1

Year Built: 1930

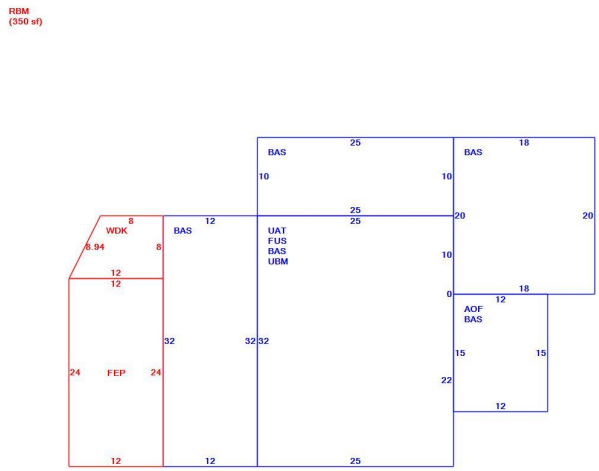
Building Photo

Living Area: 2,954

Building Attributes : Bldg 2 of 2	
Field	**Description**
Style	Colonial
Model	Residential
Grade:	Good
Stories:	2 Stories
Occupancy	1
Exterior Wall 1	Aluminum Sidng
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Plastered
Interior Wall 2	Cust Wd Panel
Interior Flr 1	Hardwood
Interior Flr 2	Carpet
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	4 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	1
Total Rooms:	12 Rooms
Bath Style:	Average
Kitchen Style:	Average
Num Kitchens	01
Cndtn	
Usrfld 103	
Usrfld 104	
Usrfld 105	
Usrfld 106	
Usrfld 107	
Num Park	
Fireplaces	
Usrfld 108	
Usrfld 101	
Usrfld 102	
Usrfld 100	
Usrfld 300	
Usrfld 301	

(http://images.vgsi.com/photos/DeepRiverCTPhotos//\00\00\63\64.jpg)

Building Layout



(ParcelSketch.ashx?pid=1745&bid=2279)

Building Sub-Areas (sq ft)			
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	1,974	1,974
FUS	Upper Story, Finished	800	800
AOF	Office, (Average)	180	180
FEP	Porch, Enclosed, Finished	288	0
RBM	Rec Room Bsmt	350	0
UAT	Attic, Unfinished	800	0
UBM	Basement, Unfinished	800	0
WDK	Deck, Wood	80	0
		5,272	2,954

Land

Land Use

Use Code	0316
Description	COMM WHSE
Zone	R60
Neighborhood	0002

Land Line Valuation

Size (Acres)	3.9
Assessed Value	$92,820
Appraised Value	$132,600

Outbuildings

Outbuildings		
Code	**Description**	**Size**
SHD1	SHED FRAME	30.00 S.F.
SPL3	GUNITE	800.00 S.F.
SHD2	W/LIGHTS ETC	80.00 S.F.

Exhibit C

Construction Drawings

T-MOBILE SITE NAME:

DEEP RIVER/RT 9

T-MOBILE SITE NUMBER:

CT11237C

CROWN BU: 823666 / APP#: 479818

67D94AR V2 CONFIGURATION

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

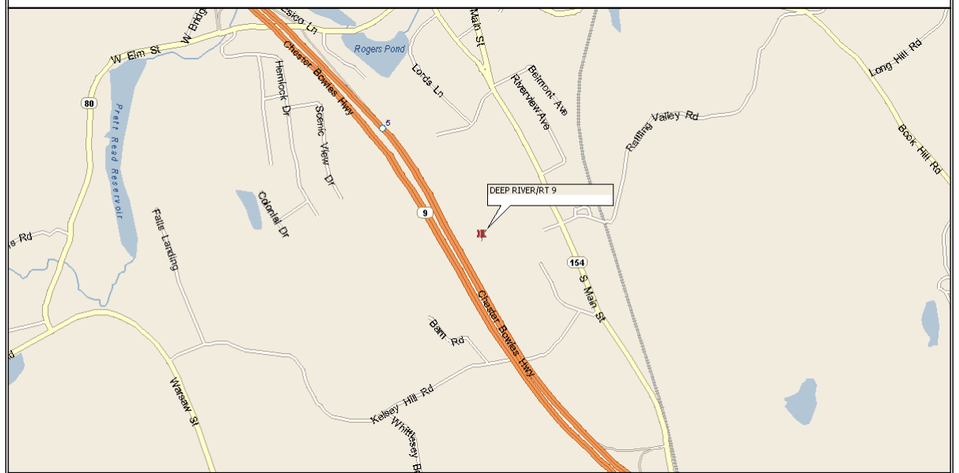
PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	15 PENT ROAD DEEP RIVER, CT 06417
JURISDICTION:	TOWN OF DEEP RIVER, CT

NAD83

LATITUDE:	41.372826° N
LONGITUDE:	72.434437° W
TOWER OWNER:	CROWN CASTLE 3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406 JASON SMITH (610) 635-3225
CUSTOMER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054 (973) 397-4800
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP



NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	ANTENNA AND RRU DETAILS	1
A-4.1	RRU GROUND MOUNTING DETAIL	1

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119	ELECTRIC PROVIDER:	N/A
CONTACT:	MIKE OAKES	TELCO PROVIDER:	AT&T
PHONE:	(918) 587-4630		855-637-9527

CODE COMPLIANCE

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED 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:

CODE TYPE	CODE
BUILDING/DWELLING	2018 CT SBC
STRUCTURAL	2018 CT SBC
MECHANICAL	2018 CT SBC
ELECTRICAL	2018 CT SBC

DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT ON LOCAL ROAD. TAKE LOCAL ROAD ONTO TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. TAKE RAMP ONTO I-91 [RICHARD P HORAN MEMORIAL HWY]. AT EXIT 22S, TAKE RAMP ONTO CT-9. KEEP STRAIGHT ONTO CT-17 [CT-9]. AT EXIT 13, ROAD NAME CHANGES TO CT-9. AT EXIT 4, KEEP RIGHT ONTO RAMP. TURN LEFT ONTO CT-154 [DEEP RIVER RD]. KEEP STRAIGHT ONTO CT-154 [S MAIN ST]. TURN LEFT ONTO KELSEY HILL RD. KEEP STRAIGHT ONTO SYLVAN TERRACE. BEAR LEFT ONTO LOCAL ROAD. ARRIVE AT DEEP RIVER/RT 9.

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 177'-0".
- REMOVE (1) EXISTING DUS41 IN EXISTING CABINET.
- RELOCATE (3) TMAS AT 177'-0"
- INSTALL (3) NEW ANTENNAS AT 177'-0".
- INSTALL (3) NEW RRUS AT 177'-0".
- INSTALL (3) NEW RRUS AT GROUND LEVEL.
- INSTALL (3) NEW TMAS AT 177'-0".
- INSTALL (1) NEW HCS 6x12 HYBRID CABLE FOR NEW ANTENNAS.
- INSTALL (1) NEW PPC CABINET.
- INSTALL (2) NEW BB 6630s IN NEW CABINET.

DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

811

B+T GRP

CROWN CASTLE

T-Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

PROJECT NO:	135998.001.01
CHECKED BY:	RMC

ISSUED FOR:

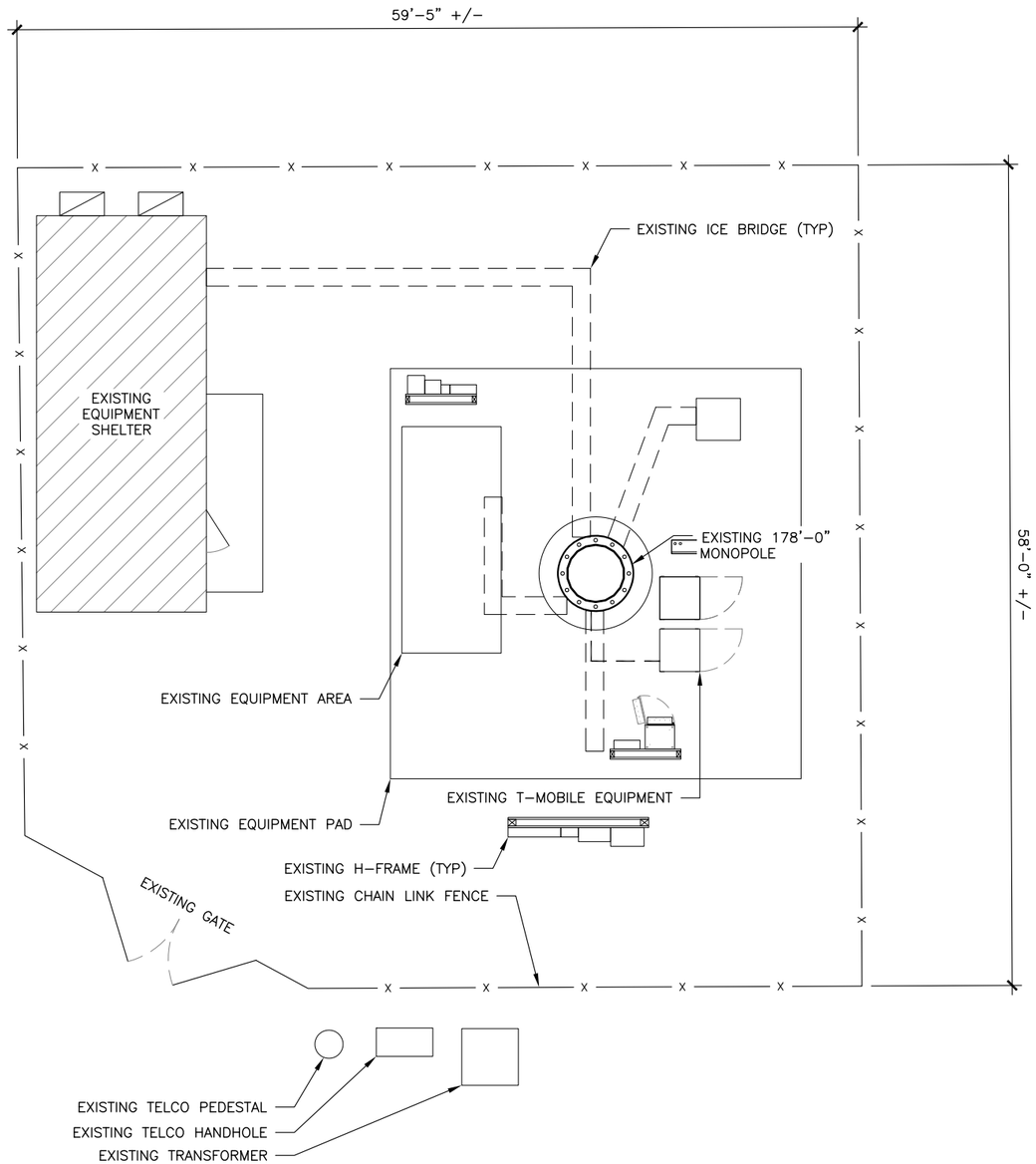
REV	DATE	DRWN	DESCRIPTION
A	5/23/19	STH	PRELIMINARY REVIEW
B	8/2/19	JJD	PRELIMINARY REVIEW
0	9/25/19	JCO	CONSTRUCTION
1	10/15/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER

10/15/19

SHEET NUMBER:	REVISION:
T-1	1



1 OVERALL SITE PLAN

SCALE: 0' 4' 8' 16' 32'

N

GENERAL NOTES:

1. SUBJECT PROPERTY IS KNOWN AS BLOCK TBD LOT TBD AS SHOWN ON THE DEEP RIVER TOWNSHIP TAX MAP AND IS SITUATED AT 15 PENT ROAD, DEEP RIVER, CT 06417.

2. APPLICANT: T-MOBILE
A DELAWARE LIMITED LIABILITY COMPANY
4 SYLVAN WAY
PARSIPPANY, NEW JERSEY 07054
(973) 397-4800

   TOWER OWNER: CROWN CASTLE INTERNATIONAL

- THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING THREE (3) NEW PANEL ANTENNAS, THREE (3) TMAS, THREE (3) RRUS, AND ONE (1) ADDITIONAL CABLE MOUNTED ON AN EXISTING MONOPOLE.

3. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.

4. THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.372826° N± AND LONGITUDE OF 72.434437° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).

5. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"

6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

   6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   6.B. CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.

7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.

8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.

9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.

10. SITE INFORMATION SHOWN TAKEN FROM CROWN CASTLE SITE PLANS AND FROM CROWN CASTLE INSPECTION PHOTOS.

11. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.

12. ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.

B+T GRP

CROWN CASTLE

T-Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

PROJECT NO:	135998.001.01
CHECKED BY:	RMC

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER

10/15/19

SHEET NUMBER: A-1

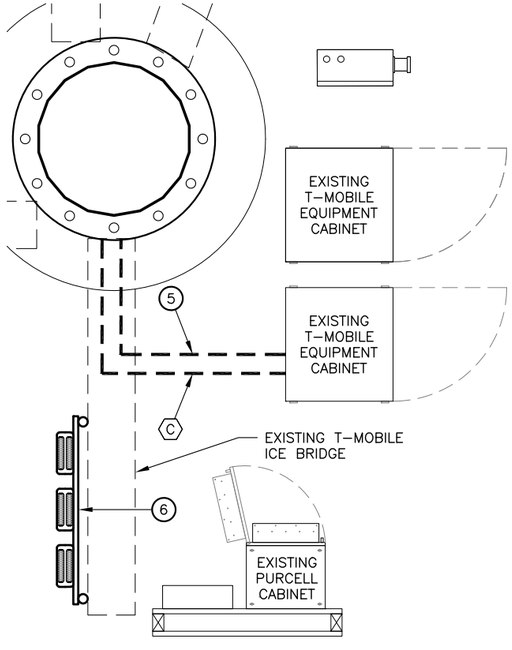
REVISION: 1

LEGEND

EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING EMS WIRELESS RR90-17-02DP ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING COMMSCOPE LNX-6515DS-VTM ANTENNA TO BE REMOVED (TOTAL OF 3)	2	INSTALL NEW ERICSSON KRY 112 144/1 TMA BEHIND ANTENNA (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	EXISTING ANDREW LDF7-50A COAX CABLES TO REMAIN (TOTAL OF 12)	3	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
D	EXISTING (3) TWIN PCS KRY 112 489/2 TMA TO BE RELOCATED.	4	INSTALL EXISTING (3) TWIN PCS KRY 112 489/2 TMA
		5	INSTALL (1) HCS 6x12 HYBRID FIBER TRUNK FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
		6	INSTALL (3) 4415 B66A RADIOS ON PROPOSED H-FRAME. RE: 1/A-4.1

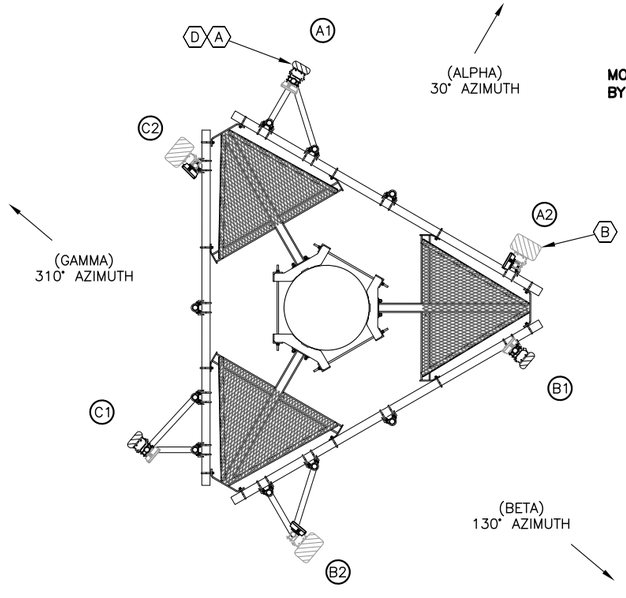
ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
30° – ALPHA	A1	EMS RR90-17-XXDP	–	–	2°	0°	177'-0"	0/0	–	–	–
	A2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71+ B12 B66A**	**2°/2°/2°**	**0°**		**2/1**	**(1) 6x12 HCS (4) 1 5/8 COAX**	**(4) COAX (1) FIBER**	**227'-0"**
130° – BETA	B1	EMS RR90-17-XXDP	–	–	2°	0°	177'-0"	0/0	–	–	–
	B2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71+ B12 B66A**	**2°/2°/2°**	**0°**		**2/1**	**SHARED FIBER (4) 1 5/8" COAX**	**(4) COAX (1) FIBER**	**227'-0"**
310° – GAMMA	C1	EMS RR90-17-XXDP	–	–	2°	0°	177'-0"	0/0	–	–	–
	C2	**RFS APXVAARR24_43-U-NA20**	**LTE UMTS**	**B71+ B12 B66A**	**2°/2°/2°**	**0°**		**2/1**	**SHARED FIBER (4) 1 5/8" COAX**	**(4) COAX (1) FIBER**	**227'-0"**



1 ENLARGED AREA PLAN

SCALE: 0' 1' 2' 4' 10'

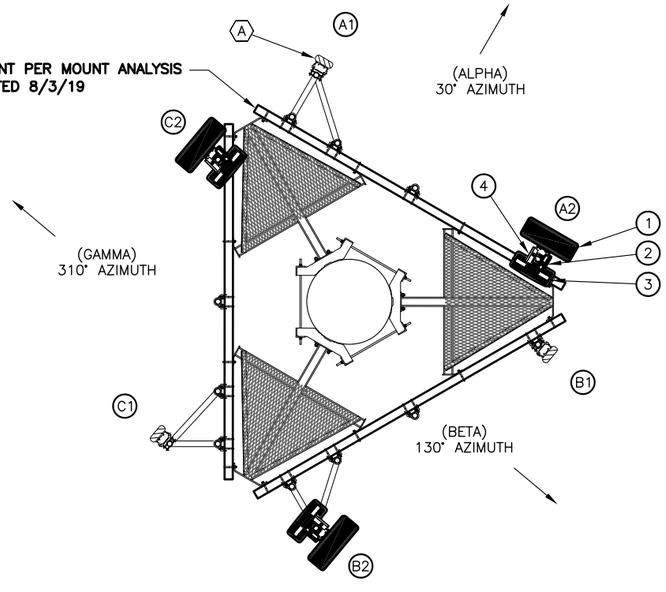


2 EXISTING ANTENNA ORIENTATION

SCALE: 0' 1' 4' 8' 16'

N

MODIFY EXISTING MOUNT PER MOUNT ANALYSIS BY PAUL J. FORD DATED 8/3/19



3 PROPOSED ANTENNA ORIENTATION

SCALE: 0' 1' 4' 8' 16'

N

B+T GRP

CROWN CASTLE

T-Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

PROJECT NO:	135998.001.01
CHECKED BY:	RMC

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT 31627 LICENSED PROFESSIONAL ENGINEER

10/15/19

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
A-2	1

LEGEND

EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING EMS WIRELESS RR90-17-02DP ANTENNA TO REMAIN (TOTAL OF 3)	1	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING COMMSCOPE LNX-6515DS-VTM ANTENNA TO BE REMOVED (TOTAL OF 3)	2	INSTALL NEW ERICSSON KRY 112 144/1 TMA BEHIND ANTENNA (TYP. OF 1 PER SECTOR, TOTAL OF 3)
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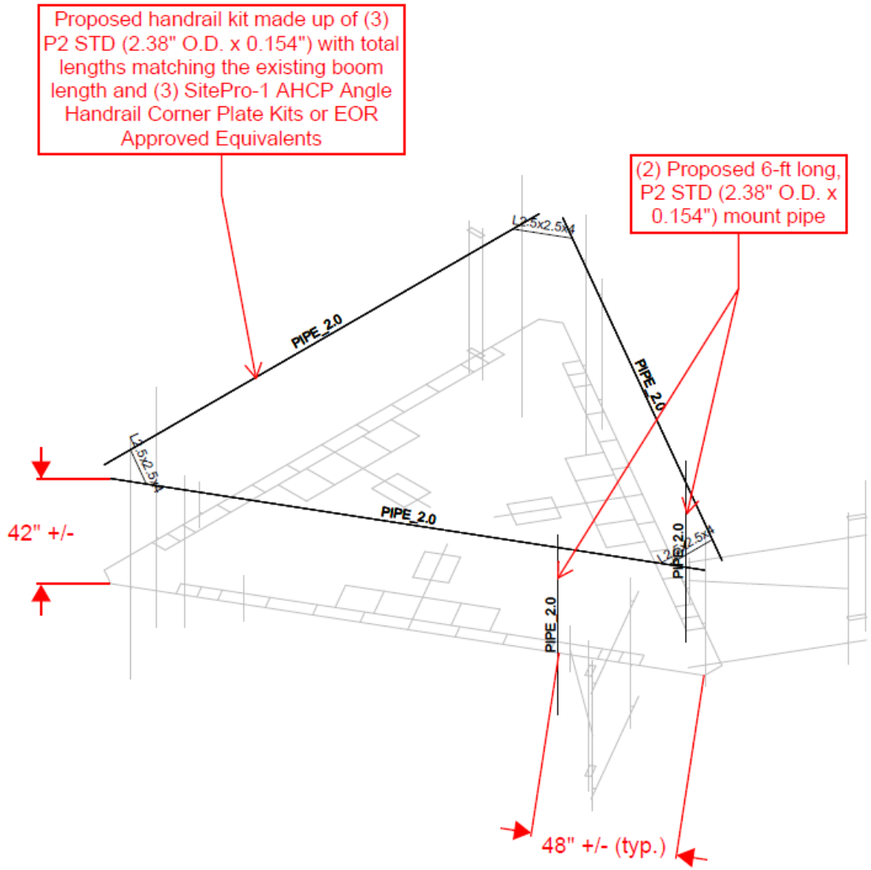
D	EXISTING (3) TWIN PCS KRY 112 489/2 TMA TO BE RELOCATED.	4	INSTALL EXISTING (3) TWIN PCS KRY 112 489/2 TMA
		5	INSTALL (1) HCS 6x12 HYBRID FIBER TRUNK FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING

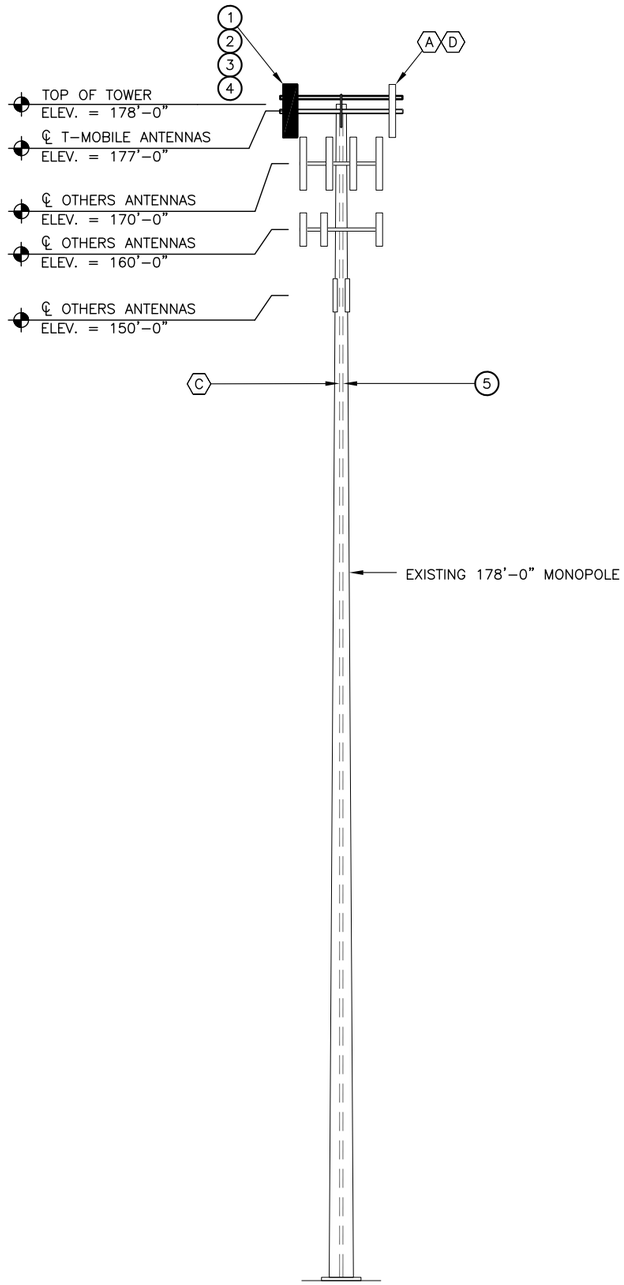
MODIFY EXISTING MOUNT PER MOUNT ANALYSIS BY PAUL J. FORD DATED 8/3/19

LEGEND:

- NEW
- EXISTING
- FUTURE



1 MOUNT MODIFICATION
SCALE:



2 TOWER ELEVATION
SCALE: 1"=30'
0' 15' 30' 45' 60'

B+T GRP

CROWN CASTLE

T-Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

PROJECT NO:	135998.001.01
CHECKED BY:	RMC

ISSUED FOR:

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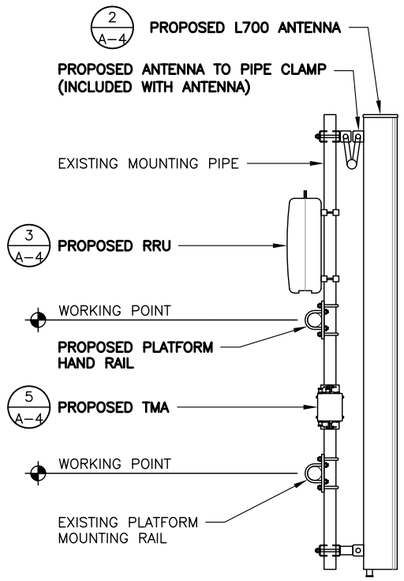
0	9/25/19	JCO	CONSTRUCTION
1	10/15/19	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

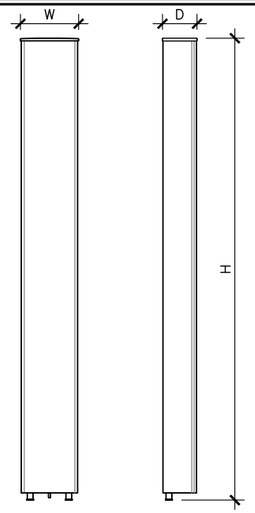
STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
10/15/19

SHEET NUMBER: A-3
REVISION: 1



PROPOSED ANTENNA & RRU MOUNTING DETAIL

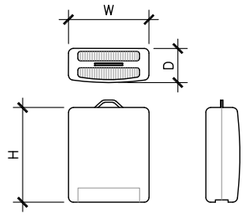
1 SCALE: N.T.S.



ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

L700/L600 ANTENNA DETAIL

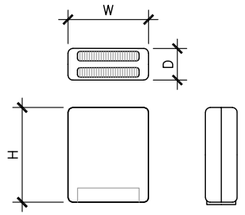
2 SCALE: N.T.S.



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

REMOTE RADIO UNIT (RRU)

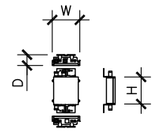
3 SCALE: N.T.S.



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4415 B25
WIDTH	13.4"
DEPTH	5.9"
HEIGHT	16.5"
WEIGHT	46 LBS

REMOTE RADIO UNIT (RRU)

4 SCALE: N.T.S.



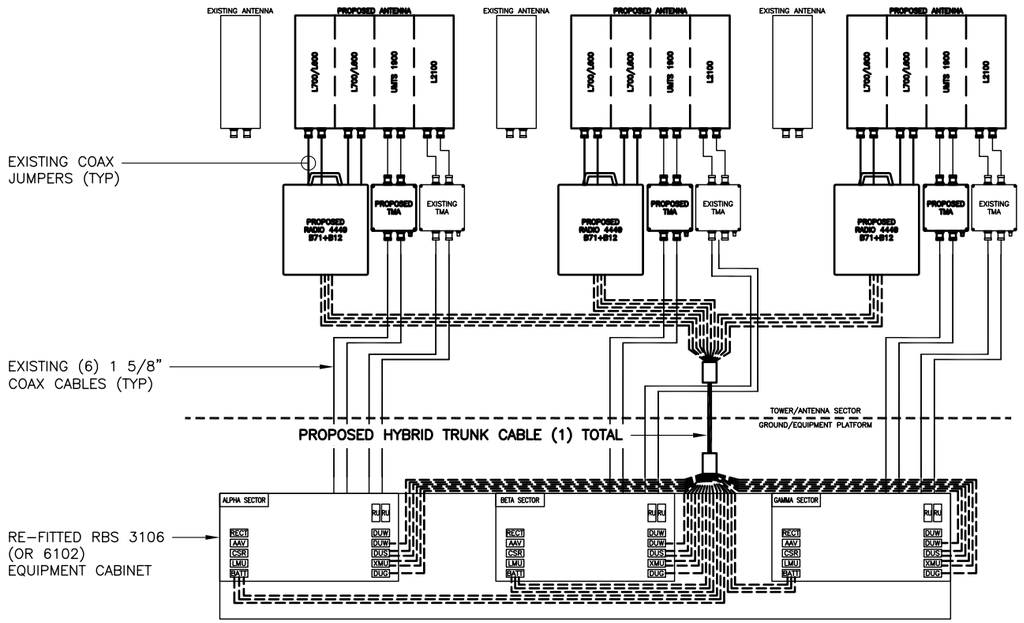
KRY 112 144/1

TMA SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	KRY 112 144/1
WIDTH	6.1"
DEPTH	2.8"
HEIGHT	6.93"
WEIGHT	74 LBS

TOWER MOUNTED AMP. (TMA)

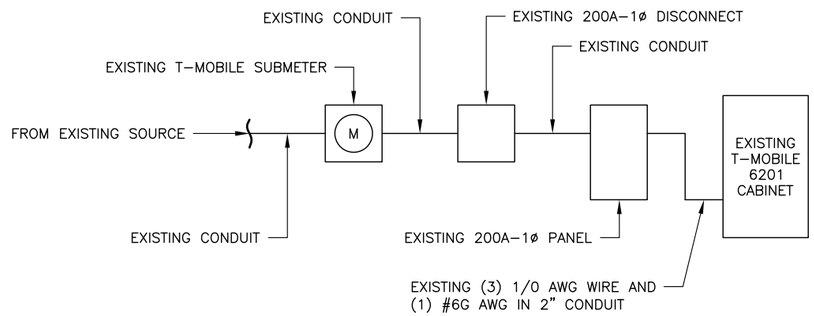
5 SCALE: N.T.S.

NOTES:
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
3. REFER TO ANTENNA ORIENTATION ON SHEET C-3 FOR EXACT ANTENNA POSITIONING.



ANTENNA & CABLING SCHEMATIC

6 SCALE: N.T.S.



ONE-LINE DIAGRAM

7 SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

PROJECT NO:	135998.001.01
CHECKED BY:	RMC

ISSUED FOR:

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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

SHEET NUMBER: A-4

REVISION: 1

NOTES:

1. ALCATEL–LUCENT (ALU) VIA AT&T SUPPLIES THE RRH. SUBCONTRACTOR SHALL SUPPLY ALL OTHER MATERIALS AND INSTALL ALL MOUNTING HARDWARE. ALU INSTALLS RRH AND MAKES CABLE TERMINATIONS.

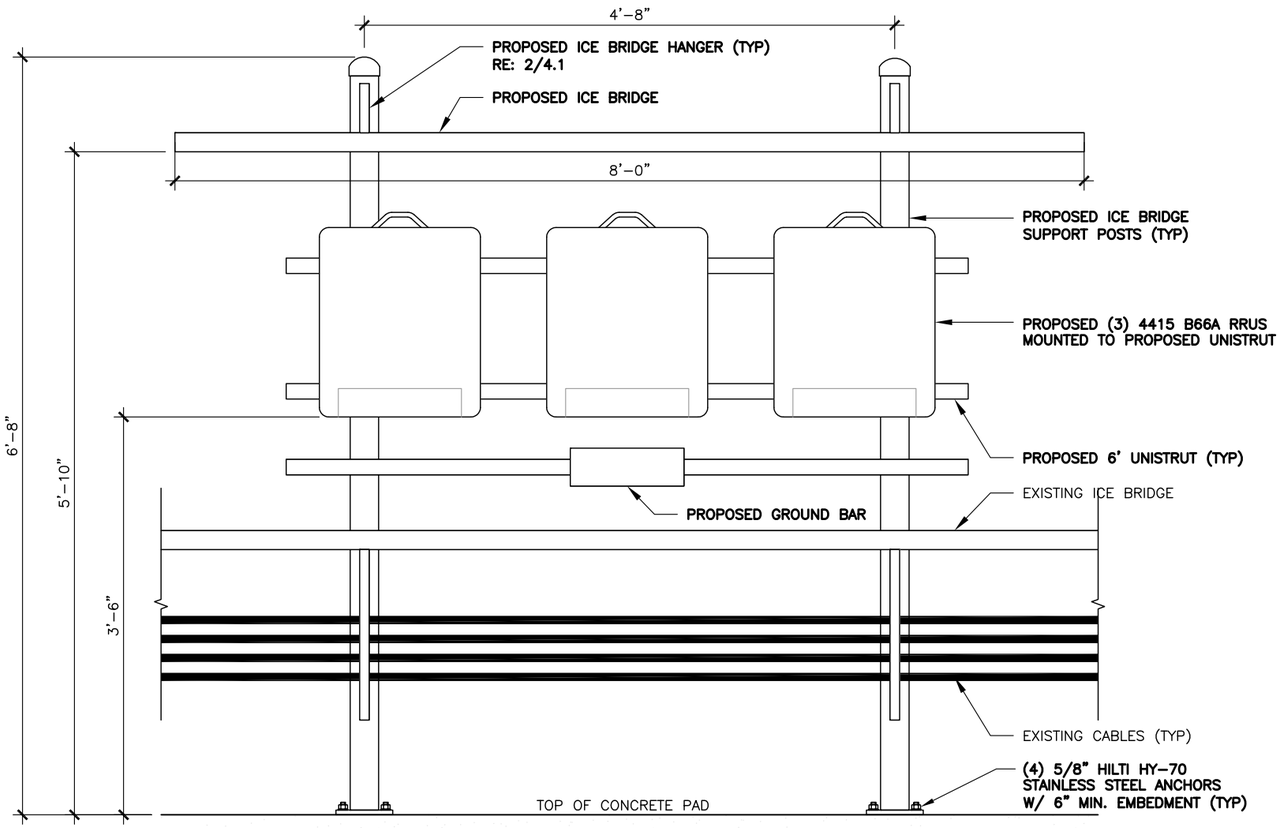
2. A SUPPORT FOR A SINGLE RRH SHALL HAVE A MINIMUM OF TWO ANCHORS/FASTENERS FOR EACH UNISTRUT CHANNEL.

3. INSTALL ANCHORS/FASTENERS A MAXIMUM OF 2'–0" ON CENTERS.
   - WOOD STUDS – 1/4"ø LAG BOLT W/ 1" EMBEDMENT IN WOOD
   - CONCRETE – 1/4"ø HILTI KWIK BOLT III W/ 1–1/2" EMBEDMENT OR APPROVED EQUAL
   - THROUGH BOLT – 1/4"ø A36/A307 THREADED ROD W/ NUTS AND WASHERS
   - MASONRY – 1/2"ø HILTI HY20 W/6" EMBEDMENT ANCHORS AND UNISTRUT CHANNEL SHALL HAVE HOT–DIPPED GALVANIZED FINISH.

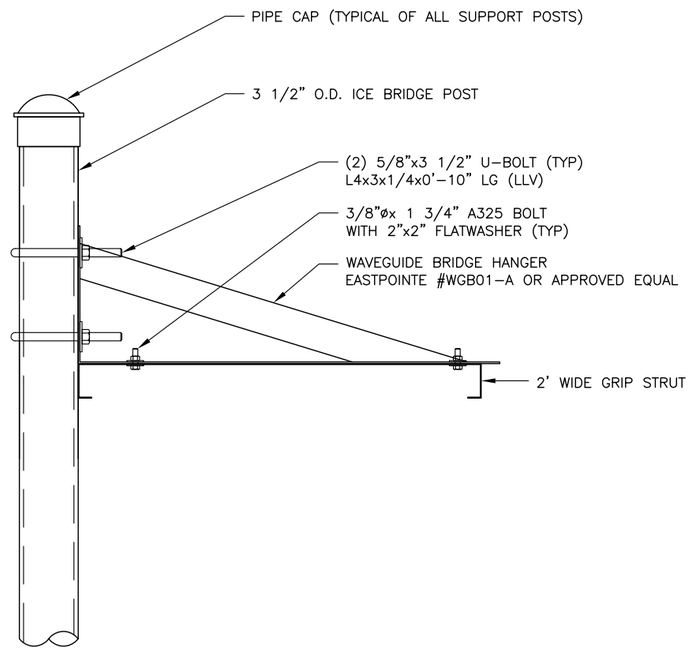
4. MOUNT RRH TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET. SUBCONTRACTOR SHALL SUPPLY.

5. NO PAINTING OF THE RRH OR SOLAR SHIELD IS ALLOWED.

NOTE: EXISTING LTE COAX SHALL BE RE–TERMINATED AS REQUIRED TO ACCOMMODATE NEW LTE RRHS. (CONTRACTOR SHALL FIELD VERIFY COAX RE–TERMINATION POINT).



1 TYPICAL RRH TO ICE BRIDGE POST MOUNTING DETAIL
SCALE: N.T.S.



2 ENLARGED TYP. WAVEGUIDE BRIDGE SECTION
SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T···Mobile

CT11237C
BU #: 823666

DEEP RIVER/RT 9

15 PENT ROAD
DEEP RIVER, CT 06417

EXISTING 178'-0" MONOPOLE

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B&T ENGINEERING, INC.
PEC.0001564
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STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER

10/15/19

SHEET NUMBER:	REVISION:
A-4.1	1

Exhibit D

Structural Analysis Report

Date: **May 10, 2019**

Darcy Tarr
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

AW Solutions
300 Crown Oak Centre Drive
Longwood, FL 32750
(407) 260-0231

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11237C
	Carrier Site Name:	Deep River/Rt 9
Crown Castle Designation:	**Crown Castle BU Number:**	823666
	Crown Castle Site Name:	Deep River/Rt 9
	Crown Castle JDE Job Number:	559236
	Crown Castle Work Order Number:	1739713
	Crown Castle Order Number:	479818 Rev. 0
Engineering Firm Designation:	**AW Solutions Project Number:**	823666
Site Data:	**15 Pent Rd., Deep River, Middlesex County, CT** **Latitude *41° 22' 22.17"*, Longitude *-72° 26' 3.97"*** **178 Foot - Monopole Tower**	

Ms. Tarr,

AW Solutions 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**

Structure Rating (max from all components) =	**74.1%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code (2015 IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Charles Springer, E.I. / AL

Respectfully submitted by:

05/13/19

Alan Lockrem, P.E.
Director of Engineering

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1) INTRODUCTION

This tower is a 178 ft Monopole tower designed by PIROD MANUFACTURES INC.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 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)
178.0	178.0	1	tower mounts	Platform Mount [LP 405-1]	13	1-5/8
		2	tower mounts	Side Arm Mount [SO 310-1]		
		1	tower mounts	Miscellaneous [NA 510-1]-18'		
	177.0	3	ems wireless	RR90-17-02DP w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	KRY 112 489/2		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		

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)
170.0	170.0	3	alcatel lucent	B4 RRH2X60-4R	13	1-5/8
		3	antel	BXA-70063/6CF w/ Mount Pipe		
		6	commscope	HBXX-6517DS-A2M w/ Mount Pipe		
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		1	raycap	RHSDC-3315-PF-48		
		1	tower mounts	Platform Mount [LP 303-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
160.0	160.0	3	cci antennas	TPA-65R-LCUUUU-H8	2 4 12	3/8 7/16 1-5/8
		1	commscope	SBNH-1D6565C		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	kaelus	DBC0061F1V51-2		
		2	kmw communications	AM-X-CD-17-65-00T-RET		
		6	powerwave technologies	7020.00		
		3	powerwave technologies	7770.00		
		6	powerwave technologies	LGP21401		
		3	powerwave technologies	LGP21903		
		2	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 301-1]		
150.0	150.0	3	rfs celwave	APXV18-206517LS w/ Mount Pipe	-	-
		1	tower mounts	Pipe Mount [PM 602-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, PE	3585271	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PIROD	3845247	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PIROD	3585272	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORT	Crown Castle	7169337	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) 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) Base plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.
4) Soil Friction angle of 40 degrees was conservatively assumed.
5) Base plate size and grade per previous structural analysis (Ref. Doc. 7169337).

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	178 - 164.25	Pole	TP26x12.75x0.25	1	-6.14	1118.08	12.3	Pass
L2	164.25 - 129.667	Pole	TP34.0625x22.6894x0.3125	2	-14.61	1985.41	42.6	Pass
L3	129.667 - 96	Pole	TP41.75x32.2749x0.375	3	-22.38	2938.76	49.4	Pass
L4	96 - 63.1667	Pole	TP49.0625x39.8209x0.375	4	-31.67	3460.50	59.4	Pass
L5	63.1667 - 31.1667	Pole	TP56.125x46.9571x0.375	5	-42.28	3964.23	66.9	Pass
L6	31.1667 - 0	Pole	TP62.9375x53.847x0.375	6	-56.61	4574.01	74.1	Pass
							Summary	
						Pole (L6)	74.1	Pass
						Rating =	74.1	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	66.9	Pass
1,2	Base Plate	0	74.1	Pass
1	Base Foundation Structural	0	42.6	Pass
1	Base Foundation Soil Interaction	0	67.0	Pass

Structure Rating (max from all components) =	74.1%

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity consumed.
2) Base plates are assumed to have the same capacity as their respective shaft.

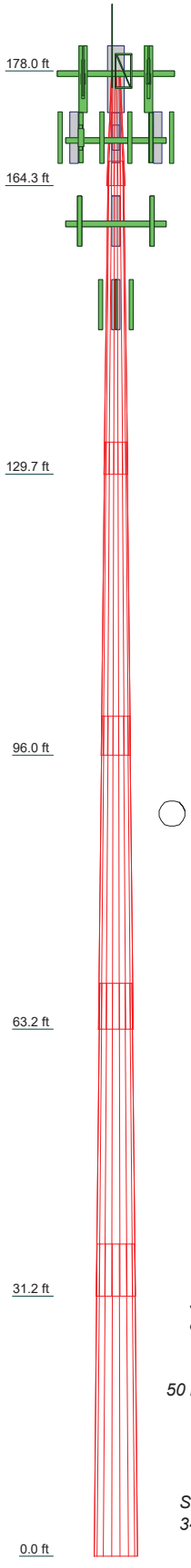
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	13'9"	18	0.2500	2'11-1/32"	12.7500	26.0000	A572-65	0.7
2	37'6"	18	0.3125	3'9-31/32"	22.6894	34.0625		3.6
3	37'6"	18	0.3750	4'8-1/32"	32.2749	41.7500		5.6
4	37'6"	18	0.3750	5'6"	39.8209	49.0625		6.7
5	37'6"	18	0.3750	6'3"	46.9571	56.1250		7.8
6	37'5-1/32"	18	0.3750		53.8470	62.9375		8.8



ALL REACTIONS ARE FACTORED

AXIAL 90 K

SHEAR 8 K *MOMENT 1081 kip-ft*

TORQUE 0 kip-ft

50 mph WIND - 1.5000 in ICE

AXIAL 57 K

SHEAR 34 K *MOMENT 4470 kip-ft*

TORQUE 0 kip-ft

REACTIONS - 130 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TIA-222-H Annex S
9. TOWER RATING: 74.1%

AW Solutions

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Phone: (407) 260-0231
FAX:

Job: ***BU823666***			
Project: ***WO1739713***			
Client: Crown Castle	Drawn by: Charles.Springer		App'd:
Code: TIA-222-H	Date: 05/10/19		Scale: NTS
Path: C:\Users\charles.springer\Desktop\BU823666 - WO1739713\ENGINEERING\BU823666 - WO1739713.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Middlesex County, Connecticut.
2) Tower base elevation above sea level: 95'.
3) Basic wind speed of 130 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'.
9) Nominal ice thickness of 1.5000 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) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) TIA-222-H Annex S.
16) A non-linear (P-delta) analysis was used.
17) Pressures are calculated at each section.
18) Stress ratio used in pole design is 1.05.
19) Tower analysis based on target reliabilities in accordance with Annex S.
20) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
21) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	178'-164'3"	13'9"	2'11-1/32"	18	12.7500	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	164'3"-129'8-1/32"	37'6"	3'9-31/32"	18	22.6894	34.0625	0.3125	1.2500	A572-65 (65 ksi)
L3	129'8-1/32"-96'	37'6"	4'8-1/32"	18	32.2749	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	96'-63'2-1/32"	37'6"	5'6"	18	39.8209	49.0625	0.3750	1.5000	A572-65 (65 ksi)
L5	63'2-1/32"-31'2-1/32"	37'6"	6'3"	18	46.9571	56.1250	0.3750	1.5000	A572-65 (65 ksi)
L6	31'2-1/32"-0'	37'5-1/32"		18	53.8470	62.9375	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	12.9081	9.9187	195.8008	4.4375	6.4770	30.2302	391.8592	4.9603	1.8040	7.216
	26.3625	20.4326	1711.6544	9.1412	13.2080	129.5922	3425.5610	10.2183	4.1360	16.544
L2	23.8894	22.1951	1404.0863	7.9438	11.5262	121.8168	2810.0202	11.0996	3.4433	11.019
	34.5398	33.4758	4817.4335	11.9812	17.3038	278.4040	9641.2058	16.7411	5.4450	17.424
L3	33.6985	37.9689	4881.3984	11.3245	16.3957	297.7251	9769.2198	18.9880	5.0204	13.388
	42.3362	49.2466	10650.9822	14.6881	21.2090	502.1916	21315.9793	24.6280	6.6880	17.835
L4	41.5451	46.9505	9229.5502	14.0033	20.2290	456.2533	18471.2448	23.4797	6.3485	16.929
	49.7615	57.9503	17355.1378	17.2841	24.9238	696.3293	34733.1119	28.9807	7.9750	21.267
L5	48.9890	55.4443	15199.5865	16.5366	23.8542	637.1873	30419.1729	27.7274	7.6044	20.279
	56.9330	66.3564	26056.1506	19.7913	28.5115	913.8821	52146.5865	33.1845	9.2180	24.581
L6	56.1617	63.6451	22990.8579	18.9826	27.3543	840.4848	46011.9678	31.8286	8.8171	23.512
	63.8506	74.4650	36822.8946	22.2097	31.9722	1151.7142	73694.2417	37.2396	10.4170	27.779

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 178'-164'3"				1	1	1			
L2 164'3"-129'8-1/32"				1	1	1			
L3 129'8-1/32"-96'				1	1	1			
L4 96'-63'2-1/32"				1	1	1			
L5 63'2-1/32"-31'2-1/32"				1	1	1			
L6 31'2-1/32"-0'				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
178										
AVA7-50(1-5/8)	C	No	Surface Ar (CaAa)	178' - 0'	6	4	-0.100 0.000	2.0100		0.70
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	160' - 0'	4	4	-0.400 -0.300	1.9800		0.82
Misc										
PiROD Ladder	B	No	Surface Ar (CaAa)	178' - 0'	1	1	0.000 0.000	1.2500		0.70

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8)	C	No	No	Inside Pole	178' - 0'	7	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
170									
LDF7-50A(1-5/8)	B	No	No	Inside Pole	170' - 0'	13	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
160									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	160' - 0'	8	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-002-75000(3/8)	A	No	No	Inside Pole	160' - 0'	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	A	No	No	Inside Pole	160' - 0'	4	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
							2" Ice	0.00	0.14

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	178'-164'3"	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.719	0.000	0.07
		C	0.000	0.000	11.055	0.000	0.14
L2	164'3"-129'8-1/32"	A	0.000	0.000	24.024	0.000	0.32
		B	0.000	0.000	4.323	0.000	0.39
		C	0.000	0.000	27.805	0.000	0.34
L3	129'8-1/32"-96'	A	0.000	0.000	26.664	0.000	0.35
		B	0.000	0.000	4.208	0.000	0.38
		C	0.000	0.000	27.068	0.000	0.33
L4	96'-63'2-1/32"	A	0.000	0.000	26.004	0.000	0.35
		B	0.000	0.000	4.104	0.000	0.37
		C	0.000	0.000	26.398	0.000	0.33
L5	63'2-1/32"-31'2-1/32"	A	0.000	0.000	25.344	0.000	0.34
		B	0.000	0.000	4.000	0.000	0.36
		C	0.000	0.000	25.728	0.000	0.32
L6	31'2-1/32"-0'	A	0.000	0.000	24.684	0.000	0.33

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	3.896	0.000	0.35
		C	0.000	0.000	25.058	0.000	0.31

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	178'-164'3"	A	1.502	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	5.850	0.000	0.14
		C		0.000	0.000	18.983	0.000	0.37
L2	164'3"-129'8-1/32"	A	1.479	0.000	0.000	41.423	0.000	0.75
		B		0.000	0.000	14.715	0.000	0.57
		C		0.000	0.000	47.746	0.000	0.93
L3	129'8-1/32"-96'	A	1.441	0.000	0.000	45.782	0.000	0.83
		B		0.000	0.000	14.170	0.000	0.55
		C		0.000	0.000	46.287	0.000	0.90
L4	96'-63'2-1/32"	A	1.392	0.000	0.000	44.335	0.000	0.79
		B		0.000	0.000	13.568	0.000	0.53
		C		0.000	0.000	44.827	0.000	0.86
L5	63'2-1/32"-31'2-1/32"	A	1.321	0.000	0.000	42.815	0.000	0.76
		B		0.000	0.000	12.908	0.000	0.51
		C		0.000	0.000	43.295	0.000	0.82
L6	31'2-1/32"-0'	A	1.180	0.000	0.000	41.150	0.000	0.71
		B		0.000	0.000	12.132	0.000	0.48
		C		0.000	0.000	41.618	0.000	0.77

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	178'-164'3"	0.9887	4.1012	1.1684	2.9524
L2	164'3"-129'8-1/32"	-2.2568	4.2517	-1.4204	3.1437
L3	129'8-1/32"-96'	-2.8384	4.6205	-1.9089	3.5196
L4	96'-63'2-1/32"	-3.0321	4.8971	-2.0929	3.8154
L5	63'2-1/32"-31'2-1/32"	-3.1834	5.1131	-2.2454	4.0532
L6	31'2-1/32"-0'	-3.3055	5.2876	-2.3770	4.2466

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	AVA7-50(1-5/8)	164.25 - 178.00	1.0000	1.0000
L1	12	PiROD Ladder	164.25 - 178.00	1.0000	1.0000
L1	8	LDF7-50A(1-5/8)	164.25 - 160.00	1.0000	1.0000
L2	2	AVA7-50(1-5/8)	129.67 - 164.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	8	LDF7-50A(1-5/8)	129.67 - 160.00	1.0000	1.0000
L2	12	PiROD Ladder	129.67 - 164.25	1.0000	1.0000
L3	2	AVA7-50(1-5/8)	96.00 - 129.67	1.0000	1.0000
L3	8	LDF7-50A(1-5/8)	96.00 - 129.67	1.0000	1.0000
L3	12	PiROD Ladder	96.00 - 129.67	1.0000	1.0000
L4	2	AVA7-50(1-5/8)	63.17 - 96.00	1.0000	1.0000
L4	8	LDF7-50A(1-5/8)	63.17 - 96.00	1.0000	1.0000
L4	12	PiROD Ladder	63.17 - 96.00	1.0000	1.0000
L5	2	AVA7-50(1-5/8)	31.17 - 63.17	1.0000	1.0000
L5	8	LDF7-50A(1-5/8)	31.17 - 63.17	1.0000	1.0000
L5	12	PiROD Ladder	31.17 - 63.17	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Misc									
Lightning Rod 5/8" x 5' on 6' pole	C	From Leg	0.00 0' 3'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	2.04 2.91 3.78 5.19	2.04 2.91 3.78 5.19	0.05 0.08 0.10 0.18
178									
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	4.59 5.02 5.44 6.30	3.32 4.09 4.78 6.23	0.03 0.07 0.12 0.22
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	4.59 5.02 5.44 6.30	3.32 4.09 4.78 6.23	0.03 0.07 0.12 0.22
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	4.59 5.02 5.44 6.30	3.32 4.09 4.78 6.23	0.03 0.07 0.12 0.22
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	178'	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
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	178'	No Ice 1/2" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05

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	3.06	3.06	0.09
						2" Ice			
6' x 2" Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	178'	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
3' x 2" Pipe Mount	A	From Leg	4.00 0' 0'	0.0000	178'	No Ice	0.58	0.58	0.01
						1/2" Ice	0.77	0.77	0.02
						1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	B	From Leg	4.00 0' 0'	0.0000	178'	No Ice	0.58	0.58	0.01
						1/2" Ice	0.77	0.77	0.02
						1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
3' x 2" Pipe Mount	C	From Leg	4.00 0' 0'	0.0000	178'	No Ice	0.58	0.58	0.01
						1/2" Ice	0.77	0.77	0.02
						1" Ice	0.97	0.97	0.02
						2" Ice	1.39	1.39	0.05
Platform Mount [LP 405-1]	C	None		0.0000	178'	No Ice	20.80	20.80	1.80
						1/2" Ice	28.10	28.10	2.07
						1" Ice	35.40	35.40	2.33
						2" Ice	50.00	50.00	2.86
Miscellaneous [NA 510-1]-18'	C	None		0.0000	178'	No Ice	6.75	6.75	0.29
						1/2" Ice	9.56	9.56	0.38
						1" Ice	12.38	12.38	0.48
						2" Ice	17.99	17.99	0.66
Side Arm Mount [SO 310-1]	A	From Leg	0.50 0' 0'	0.0000	178'	No Ice	2.97	2.99	0.06
						1/2" Ice	4.40	4.58	0.08
						1" Ice	5.83	6.17	0.11
						2" Ice	8.69	9.35	0.17
Side Arm Mount [SO 310-1]	B	From Leg	0.50 0' 0'	0.0000	178'	No Ice	2.97	2.99	0.06
						1/2" Ice	4.40	4.58	0.08
						1" Ice	5.83	6.17	0.11
						2" Ice	8.69	9.35	0.17
KRY 112 489/2	A	From Leg	4.00 0' -1'	0.0000	178'	No Ice	0.56	0.37	0.02
						1/2" Ice	0.66	0.45	0.02
						1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
KRY 112 489/2	B	From Leg	4.00 0' -1'	0.0000	178'	No Ice	0.56	0.37	0.02
						1/2" Ice	0.66	0.45	0.02
						1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
KRY 112 489/2	C	From Leg	4.00 0' -1'	0.0000	178'	No Ice	0.56	0.37	0.02
						1/2" Ice	0.66	0.45	0.02
						1" Ice	0.76	0.54	0.03
						2" Ice	1.00	0.75	0.05
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 0' -1'	0.0000	178'	No Ice	20.48	11.02	0.16
						1/2" Ice	21.23	12.55	0.30
						1" Ice	21.99	14.10	0.44
						2" Ice	23.44	16.45	0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 0' -1'	0.0000	178'	No Ice	20.48	11.02	0.16
						1/2" Ice	21.23	12.55	0.30
						1" Ice	21.99	14.10	0.44

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	23.44	16.45	0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
KRY 112 144/1	A	From Leg	4.00 0' -1'	0.0000	178'	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' -1'	0.0000	178'	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' -1'	0.0000	178'	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
RADIO 4449 B12/B71	A	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
RADIO 4449 B12/B71	B	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
RADIO 4449 B12/B71	C	From Leg	4.00 0' -1'	0.0000	178'	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.30 1.44 1.60 1.92	0.08 0.09 0.11 0.16
170									
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.41 6.56 7.42 9.20	0.04 0.10 0.17 0.33
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.41 6.56 7.42 9.20	0.04 0.10 0.17 0.33
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.41 6.56 7.42 9.20	0.04 0.10 0.17 0.33
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.77 9.34 9.89 10.99	6.96 8.18 9.14 11.02	0.07 0.14 0.21 0.40
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0'	0.0000	170'	No Ice 1/2"	8.77 9.34	6.96 8.18	0.07 0.14

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'			Ice	9.89	9.14	0.21
						1" Ice	10.99	11.02	0.40
						2" Ice			
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	8.41 8.97 9.50 10.59	7.08 8.27 9.18 11.02	0.06 0.13 0.21 0.39
B4 RRH2X60-4R	A	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.61 3.88 4.42	2.00 2.24 2.48 2.97	0.06 0.08 0.10 0.17
B4 RRH2X60-4R	B	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.61 3.88 4.42	2.00 2.24 2.48 2.97	0.06 0.08 0.10 0.17
B4 RRH2X60-4R	C	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.61 3.88 4.42	2.00 2.24 2.48 2.97	0.06 0.08 0.10 0.17
RHSDC-3315-PF-48	C	From Leg	4.00 0' 0'	0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.03 0.06 0.09 0.17
Platform Mount [LP 303-1]	C	None		0.0000	170'	No Ice 1/2" Ice 1" Ice 2" Ice	14.66 18.87 23.08 31.50	14.66 18.87 23.08 31.50	1.25 1.48 1.71 2.18
160									
7770.00	A	From Leg	4.00 0' 0'	0.0000	160'	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	B	From Leg	4.00 0' 0'	0.0000	160'	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
7770.00	C	From Leg	4.00 0' 0'	0.0000	160'	No Ice 1/2" Ice 1" Ice 2" Ice	5.51 5.87 6.23 6.99	2.93 3.27 3.63 4.35	0.04 0.07 0.11 0.20
AM-X-CD-17-65-00T-RET	A	From Leg	4.00 0' 0'	0.0000	160'	No Ice 1/2" Ice 1" Ice 2" Ice	6.19 6.78 7.38 8.61	3.10 3.66 4.22 5.39	0.06 0.12 0.19 0.35
AM-X-CD-17-65-00T-RET	C	From Leg	4.00	0.0000	160'	No Ice	6.19	3.10	0.06

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"	6.78	3.66	0.12
			0'			Ice	7.38	4.22	0.19
						1" Ice	8.61	5.39	0.35
						2" Ice			
SBNH-1D6565C	B	From Leg	4.00	0.0000	160'	No Ice	5.67	3.40	0.05
			0'			1/2"	6.20	3.91	0.12
			0'			Ice	6.74	4.43	0.19
						1" Ice	7.86	5.49	0.36
						2" Ice			
RRUS 11	A	From Leg	4.00	0.0000	160'	No Ice	2.78	1.19	0.05
			0'			1/2"	2.99	1.33	0.07
			0'			Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS 11	B	From Leg	4.00	0.0000	160'	No Ice	2.78	1.19	0.05
			0'			1/2"	2.99	1.33	0.07
			0'			Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
RRUS 11	C	From Leg	4.00	0.0000	160'	No Ice	2.78	1.19	0.05
			0'			1/2"	2.99	1.33	0.07
			0'			Ice	3.21	1.49	0.10
						1" Ice	3.66	1.83	0.15
						2" Ice			
(2) LGP21401	A	From Leg	4.00	0.0000	160'	No Ice	1.10	0.21	0.01
			0'			1/2"	1.24	0.27	0.02
			0'			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	B	From Leg	4.00	0.0000	160'	No Ice	1.10	0.21	0.01
			0'			1/2"	1.24	0.27	0.02
			0'			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	C	From Leg	4.00	0.0000	160'	No Ice	1.10	0.21	0.01
			0'			1/2"	1.24	0.27	0.02
			0'			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
LGP21903	A	From Leg	4.00	0.0000	160'	No Ice	0.23	0.16	0.01
			0'			1/2"	0.29	0.21	0.01
			0'			Ice	0.36	0.28	0.02
						1" Ice	0.53	0.42	0.03
						2" Ice			
LGP21903	B	From Leg	4.00	0.0000	160'	No Ice	0.23	0.16	0.01
			0'			1/2"	0.29	0.21	0.01
			0'			Ice	0.36	0.28	0.02
						1" Ice	0.53	0.42	0.03
						2" Ice			
LGP21903	C	From Leg	4.00	0.0000	160'	No Ice	0.23	0.16	0.01
			0'			1/2"	0.29	0.21	0.01
			0'			Ice	0.36	0.28	0.02
						1" Ice	0.53	0.42	0.03
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	160'	No Ice	0.79	0.79	0.02
			0'			1/2"	1.27	1.27	0.04
			0'			Ice	1.45	1.45	0.05
						1" Ice	1.83	1.83	0.10
						2" Ice			
Platform Mount [LP 301-1]	C	None		0.0000	160'	No Ice	30.10	30.10	1.59
						1/2"	40.80	40.80	2.03
						Ice	51.50	51.50	2.47
						1" Ice	72.90	72.90	3.35
						2" Ice			
TPA-65R-LCUUUU-H8	A	From Leg	4.00	0.0000	160'	No Ice	13.30	8.82	0.08

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"	13.90	9.42	0.16
			0'			Ice	14.50	10.03	0.25
						1" Ice	15.74	11.26	0.45
						2" Ice			
TPA-65R-LCUUUU-H8	B	From Leg	4.00	0.0000	160'	No Ice	13.30	8.82	0.08
			0'			1/2"	13.90	9.42	0.16
			0'			Ice	14.50	10.03	0.25
						1" Ice	15.74	11.26	0.45
						2" Ice			
TPA-65R-LCUUUU-H8	C	From Leg	4.00	0.0000	160'	No Ice	13.30	8.82	0.08
			0'			1/2"	13.90	9.42	0.16
			0'			Ice	14.50	10.03	0.25
						1" Ice	15.74	11.26	0.45
						2" Ice			
(2) 7020.00	A	From Leg	4.00	0.0000	160'	No Ice	0.10	0.17	0.00
			0'			1/2"	0.15	0.24	0.01
			0'			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	B	From Leg	4.00	0.0000	160'	No Ice	0.10	0.17	0.00
			0'			1/2"	0.15	0.24	0.01
			0'			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	C	From Leg	4.00	0.0000	160'	No Ice	0.10	0.17	0.00
			0'			1/2"	0.15	0.24	0.01
			0'			Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
RRUS 32 B2	A	From Leg	4.00	0.0000	160'	No Ice	2.73	1.67	0.05
			0'			1/2"	2.95	1.86	0.07
			0'			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	B	From Leg	4.00	0.0000	160'	No Ice	2.73	1.67	0.05
			0'			1/2"	2.95	1.86	0.07
			0'			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32 B2	C	From Leg	4.00	0.0000	160'	No Ice	2.73	1.67	0.05
			0'			1/2"	2.95	1.86	0.07
			0'			Ice	3.18	2.05	0.10
						1" Ice	3.66	2.46	0.16
						2" Ice			
RRUS 32	A	From Leg	4.00	0.0000	160'	No Ice	2.86	1.78	0.06
			0'			1/2"	3.08	1.97	0.08
			0'			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	B	From Leg	4.00	0.0000	160'	No Ice	2.86	1.78	0.06
			0'			1/2"	3.08	1.97	0.08
			0'			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
RRUS 32	C	From Leg	4.00	0.0000	160'	No Ice	2.86	1.78	0.06
			0'			1/2"	3.08	1.97	0.08
			0'			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.58	0.16
						2" Ice			
DBC0061F1V51-2	A	From Leg	4.00	0.0000	160'	No Ice	0.43	0.41	0.03
			0'			1/2"	0.52	0.50	0.03
			0'			Ice	0.61	0.59	0.04
						1" Ice	0.81	0.79	0.06
						2" Ice			
DBC0061F1V51-2	B	From Leg	4.00	0.0000	160'	No Ice	0.43	0.41	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'			1/2"	0.52	0.50	0.03
			0'			Ice	0.61	0.59	0.04
						1" Ice	0.81	0.79	0.06
						2" Ice			
DBC0061F1V51-2	C	From Leg	4.00	0.0000	160'	No Ice	0.43	0.41	0.03
			0'			1/2"	0.52	0.50	0.03
			0'			Ice	0.61	0.59	0.04
						1" Ice	0.81	0.79	0.06
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	160'	No Ice	0.79	0.79	0.02
			0'			1/2"	1.27	1.27	0.04
			0'			Ice	1.45	1.45	0.05
						1" Ice	1.83	1.83	0.10
						2" Ice			
150									
APXV18-206517LS w/ Mount Pipe	A	From Leg	1.00	0.0000	150'	No Ice	5.29	4.67	0.05
			0'			1/2"	5.84	5.82	0.10
			0'			Ice	6.36	6.69	0.15
						1" Ice	7.42	8.46	0.28
						2" Ice			
APXV18-206517LS w/ Mount Pipe	B	From Leg	1.00	0.0000	150'	No Ice	5.29	4.67	0.05
			0'			1/2"	5.84	5.82	0.10
			0'			Ice	6.36	6.69	0.15
						1" Ice	7.42	8.46	0.28
						2" Ice			
APXV18-206517LS w/ Mount Pipe	C	From Leg	1.00	0.0000	150'	No Ice	5.29	4.67	0.05
			0'			1/2"	5.84	5.82	0.10
			0'			Ice	6.36	6.69	0.15
						1" Ice	7.42	8.46	0.28
						2" Ice			
Pipe Mount [PM 602-3]	C	None		0.0000	150'	No Ice	7.68	7.68	0.28
						1/2"	9.50	9.50	0.35
						Ice	11.32	11.32	0.43
						1" Ice	14.96	14.96	0.58
						2" Ice			
****									

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	178 - 164.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-15.55	0.17	-0.33
			Max. Mx	20	-6.14	77.57	-0.11
			Max. My	14	-6.27	0.09	-74.21
			Max. Vy	20	-11.78	77.57	-0.11
			Max. Vx	14	11.09	0.09	-74.21
			Max. Torque	24			-0.40
L2	164.25 - 129.667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.66	0.50	-0.11
			Max. Mx	20	-14.61	688.25	-1.12
			Max. My	2	-14.81	-1.02	649.75
			Max. Vy	20	-21.44	688.25	-1.12
			Max. Vx	14	20.23	1.34	-649.63
			Max. Torque	21			0.27
L3	129.667 - 96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.83	1.06	-0.70
			Max. Mx	20	-22.38	1450.31	-2.48
			Max. My	14	-22.54	2.69	-1369.50
			Max. Vy	20	-24.94	1450.31	-2.48
			Max. Vx	14	23.62	2.69	-1369.50
			Max. Torque	10			0.25
L4	96 - 63.1667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.71	1.70	-1.36
			Max. Mx	20	-31.67	2303.49	-3.83
			Max. My	14	-31.78	4.02	-2180.25
			Max. Vy	20	-28.30	2303.49	-3.83
			Max. Vx	14	26.98	4.02	-2180.25
			Max. Torque	10			0.25

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	63.1667 - 31.1667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.06	2.41	-2.07
			Max. Mx	20	-42.28	3237.36	-5.15
			Max. My	14	-42.35	5.34	-3073.07
			Max. Vy	20	-31.33	3237.36	-5.15
			Max. Vx	14	30.03	5.34	-3073.07
			Max. Torque	10			0.25
L6	31.1667 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-89.73	3.34	-3.01
			Max. Mx	20	-56.61	4470.10	-6.72
			Max. My	14	-56.61	6.90	-4257.90
			Max. Vy	20	-34.48	4470.10	-6.72
			Max. Vx	14	33.23	6.90	-4257.90
			Max. Torque	10			0.25

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	89.73	8.17	-0.01
	Max. H_x	20	56.63	34.46	-0.03
	Max. H_z	2	56.63	-0.03	33.20
	Max. M_x	2	4256.39	-0.03	33.20
	Max. M_z	8	4468.25	-34.46	0.03
	Max. Torsion	10	0.25	-28.74	-16.57
	Min. Vert	25	42.47	16.58	28.74
	Min. H_x	8	56.63	-34.46	0.03
	Min. H_z	14	56.63	0.03	-33.20
	Min. M_x	14	-4257.90	0.03	-33.20
	Min. M_z	20	-4470.10	34.46	-0.03
	Min. Torsion	22	-0.25	28.74	16.57

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.19	0.00	0.00	0.61	0.74	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	56.63	0.03	-33.20	-4256.39	-5.03	0.05
0.9 Dead+1.0 Wind 0 deg - No Ice	42.47	0.03	-33.20	-4205.35	-5.20	0.04
1.2 Dead+1.0 Wind 30 deg - No Ice	56.63	16.63	-28.77	-3689.04	-2133.59	-0.09
0.9 Dead+1.0 Wind 30 deg - No Ice	42.47	16.63	-28.77	-3644.80	-2108.13	-0.09
1.2 Dead+1.0 Wind 60 deg - No Ice	56.63	28.86	-16.68	-2141.99	-3705.80	-0.20
0.9 Dead+1.0 Wind 60 deg - No Ice	42.47	28.86	-16.68	-2116.36	-3661.38	-0.20
1.2 Dead+1.0 Wind 90 deg - No Ice	56.63	34.46	-0.03	-5.21	-4468.25	0.00
0.9 Dead+1.0 Wind 90 deg - No Ice	42.47	34.46	-0.03	-5.32	-4414.50	0.00
1.2 Dead+1.0 Wind 120 deg - No Ice	56.63	28.74	16.57	2124.19	-3684.27	-0.25
0.9 Dead+1.0 Wind 120 deg - No Ice	42.47	28.74	16.57	2098.43	-3640.13	-0.25
1.2 Dead+1.0 Wind 150 deg	56.63	16.58	28.74	3684.61	-2123.27	-0.17

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 0.9 Dead+1.0 Wind 150 deg - No Ice	42.47	16.58	28.74	3640.06	-2097.94	-0.16
1.2 Dead+1.0 Wind 180 deg - No Ice	56.63	-0.03	33.20	4257.90	6.90	-0.05
0.9 Dead+1.0 Wind 180 deg - No Ice	42.47	-0.03	33.20	4206.47	6.58	-0.04
1.2 Dead+1.0 Wind 210 deg - No Ice	56.63	-16.63	28.77	3690.55	2135.46	0.09
0.9 Dead+1.0 Wind 210 deg - No Ice	42.47	-16.63	28.77	3645.92	2109.50	0.10
1.2 Dead+1.0 Wind 240 deg - No Ice	56.63	-28.86	16.68	2143.50	3707.66	0.20
0.9 Dead+1.0 Wind 240 deg - No Ice	42.47	-28.86	16.68	2117.49	3662.75	0.20
1.2 Dead+1.0 Wind 270 deg - No Ice	56.63	-34.46	0.03	6.72	4470.10	-0.00
0.9 Dead+1.0 Wind 270 deg - No Ice	42.47	-34.46	0.03	6.45	4415.87	-0.00
1.2 Dead+1.0 Wind 300 deg - No Ice	56.63	-28.74	-16.57	-2122.67	3686.13	0.25
0.9 Dead+1.0 Wind 300 deg - No Ice	42.47	-28.74	-16.57	-2097.30	3641.52	0.24
1.2 Dead+1.0 Wind 330 deg - No Ice	56.63	-16.58	-28.74	-3683.10	2125.14	0.17
0.9 Dead+1.0 Wind 330 deg - No Ice	42.47	-16.58	-28.74	-3638.94	2099.33	0.17
1.2 Dead+1.0 Ice+1.0 Temp	89.73	0.00	0.00	3.01	3.34	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	89.73	0.01	-8.10	-1060.33	2.37	0.06
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	89.73	4.06	-7.02	-918.49	-529.57	-0.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	89.73	7.02	-4.06	-529.66	-918.64	-0.07
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	89.73	8.17	-0.01	1.97	-1073.61	-0.08
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	89.73	7.01	4.04	533.94	-917.35	-0.13
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	89.73	4.05	7.01	923.71	-527.34	-0.10
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	89.73	-0.01	8.10	1066.84	4.95	-0.06
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	89.73	-4.06	7.02	925.00	536.88	0.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	89.73	-7.02	4.06	536.17	925.95	0.07
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	89.73	-8.17	0.01	4.55	1080.91	0.08
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	89.73	-7.01	-4.04	-527.42	924.66	0.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	89.73	-4.05	-7.01	-917.20	534.65	0.10
Dead+Wind 0 deg - Service	47.19	0.01	-6.66	-847.80	-0.42	0.01
Dead+Wind 30 deg - Service	47.19	3.34	-5.77	-734.72	-424.62	-0.02
Dead+Wind 60 deg - Service	47.19	5.79	-3.35	-426.41	-737.96	-0.04
Dead+Wind 90 deg - Service	47.19	6.91	-0.01	-0.56	-890.04	0.00
Dead+Wind 120 deg - Service	47.19	5.77	3.32	423.81	-733.66	-0.05
Dead+Wind 150 deg - Service	47.19	3.33	5.77	734.79	-422.56	-0.03
Dead+Wind 180 deg - Service	47.19	-0.01	6.66	849.05	1.96	-0.01
Dead+Wind 210 deg - Service	47.19	-3.34	5.77	735.98	426.17	0.02
Dead+Wind 240 deg - Service	47.19	-5.79	3.35	427.67	739.51	0.04
Dead+Wind 270 deg - Service	47.19	-6.91	0.01	1.82	891.58	-0.00
Dead+Wind 300 deg -	47.19	-5.77	-3.32	-422.56	735.20	0.05

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Service Dead+Wind 330 deg - Service	47.19	-3.33	-5.77	-733.54	424.11	0.03

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-47.19	0.00	0.00	47.19	0.00	0.000%
2	0.03	-56.63	-33.20	-0.03	56.63	33.20	0.000%
3	0.03	-42.47	-33.20	-0.03	42.47	33.20	0.000%
4	16.63	-56.63	-28.77	-16.63	56.63	28.77	0.000%
5	16.63	-42.47	-28.77	-16.63	42.47	28.77	0.000%
6	28.86	-56.63	-16.68	-28.86	56.63	16.68	0.000%
7	28.86	-42.47	-16.68	-28.86	42.47	16.68	0.000%
8	34.46	-56.63	-0.03	-34.46	56.63	0.03	0.000%
9	34.46	-42.47	-0.03	-34.46	42.47	0.03	0.000%
10	28.74	-56.63	16.57	-28.74	56.63	-16.57	0.000%
11	28.74	-42.47	16.57	-28.74	42.47	-16.57	0.000%
12	16.58	-56.63	28.74	-16.58	56.63	-28.74	0.000%
13	16.58	-42.47	28.74	-16.58	42.47	-28.74	0.000%
14	-0.03	-56.63	33.20	0.03	56.63	-33.20	0.000%
15	-0.03	-42.47	33.20	0.03	42.47	-33.20	0.000%
16	-16.63	-56.63	28.77	16.63	56.63	-28.77	0.000%
17	-16.63	-42.47	28.77	16.63	42.47	-28.77	0.000%
18	-28.86	-56.63	16.68	28.86	56.63	-16.68	0.000%
19	-28.86	-42.47	16.68	28.86	42.47	-16.68	0.000%
20	-34.46	-56.63	0.03	34.46	56.63	-0.03	0.000%
21	-34.46	-42.47	0.03	34.46	42.47	-0.03	0.000%
22	-28.74	-56.63	-16.57	28.74	56.63	16.57	0.000%
23	-28.74	-42.47	-16.57	28.74	42.47	16.57	0.000%
24	-16.58	-56.63	-28.74	16.58	56.63	28.74	0.000%
25	-16.58	-42.47	-28.74	16.58	42.47	28.74	0.000%
26	0.00	-89.73	0.00	0.00	89.73	0.00	0.000%
27	0.01	-89.73	-8.10	-0.01	89.73	8.10	0.000%
28	4.06	-89.73	-7.02	-4.06	89.73	7.02	0.000%
29	7.02	-89.73	-4.06	-7.02	89.73	4.06	0.000%
30	8.17	-89.73	-0.01	-8.17	89.73	0.01	0.000%
31	7.01	-89.73	4.04	-7.01	89.73	-4.04	0.000%
32	4.05	-89.73	7.01	-4.05	89.73	-7.01	0.000%
33	-0.01	-89.73	8.10	0.01	89.73	-8.10	0.000%
34	-4.06	-89.73	7.02	4.06	89.73	-7.02	0.000%
35	-7.02	-89.73	4.06	7.02	89.73	-4.06	0.000%
36	-8.17	-89.73	0.01	8.17	89.73	-0.01	0.000%
37	-7.01	-89.73	-4.04	7.01	89.73	4.04	0.000%
38	-4.05	-89.73	-7.01	4.05	89.73	7.01	0.000%
39	0.01	-47.19	-6.66	-0.01	47.19	6.66	0.000%
40	3.34	-47.19	-5.77	-3.34	47.19	5.77	0.000%
41	5.79	-47.19	-3.35	-5.79	47.19	3.35	0.000%
42	6.91	-47.19	-0.01	-6.91	47.19	0.01	0.000%
43	5.77	-47.19	3.32	-5.77	47.19	-3.32	0.000%
44	3.33	-47.19	5.77	-3.33	47.19	-5.77	0.000%
45	-0.01	-47.19	6.66	0.01	47.19	-6.66	0.000%
46	-3.34	-47.19	5.77	3.34	47.19	-5.77	0.000%
47	-5.79	-47.19	3.35	5.79	47.19	-3.35	0.000%
48	-6.91	-47.19	0.01	6.91	47.19	-0.01	0.000%
49	-5.77	-47.19	-3.32	5.77	47.19	3.32	0.000%
50	-3.33	-47.19	-5.77	3.33	47.19	5.77	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00079099
3	Yes	4	0.00000001	0.00034134
4	Yes	6	0.00000001	0.00013921
5	Yes	6	0.00000001	0.00004505
6	Yes	6	0.00000001	0.00014106
7	Yes	6	0.00000001	0.00004559
8	Yes	4	0.00000001	0.00081264
9	Yes	4	0.00000001	0.00033751
10	Yes	6	0.00000001	0.00013810
11	Yes	6	0.00000001	0.00004474
12	Yes	6	0.00000001	0.00013887
13	Yes	6	0.00000001	0.00004502
14	Yes	4	0.00000001	0.00077808
15	Yes	4	0.00000001	0.00032830
16	Yes	6	0.00000001	0.00013969
17	Yes	6	0.00000001	0.00004521
18	Yes	6	0.00000001	0.00014043
19	Yes	6	0.00000001	0.00004533
20	Yes	4	0.00000001	0.00082702
21	Yes	4	0.00000001	0.00034875
22	Yes	6	0.00000001	0.00013906
23	Yes	6	0.00000001	0.00004508
24	Yes	6	0.00000001	0.00013825
25	Yes	6	0.00000001	0.00004479
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00084168
28	Yes	6	0.00000001	0.00011741
29	Yes	6	0.00000001	0.00011753
30	Yes	5	0.00000001	0.00085351
31	Yes	6	0.00000001	0.00011749
32	Yes	6	0.00000001	0.00011771
33	Yes	5	0.00000001	0.00084604
34	Yes	6	0.00000001	0.00011885
35	Yes	6	0.00000001	0.00011880
36	Yes	5	0.00000001	0.00085935
37	Yes	6	0.00000001	0.00011797
38	Yes	6	0.00000001	0.00011767
39	Yes	4	0.00000001	0.00010828
40	Yes	4	0.00000001	0.00051359
41	Yes	4	0.00000001	0.00052715
42	Yes	4	0.00000001	0.00011410
43	Yes	4	0.00000001	0.00050694
44	Yes	4	0.00000001	0.00051554
45	Yes	4	0.00000001	0.00010835
46	Yes	4	0.00000001	0.00052060
47	Yes	4	0.00000001	0.00052113
48	Yes	4	0.00000001	0.00011434
49	Yes	4	0.00000001	0.00051841
50	Yes	4	0.00000001	0.00050944

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	178 - 164.25	24.415	48	1.2517	0.0008
L2	167.167 - 129.667	21.598	48	1.2254	0.0003
L3	133.5 - 96	13.632	48	0.9964	0.0002
L4	100.667 - 63.1667	7.626	48	0.7354	0.0001
L5	68.6667 - 31.1667	3.498	48	0.4822	0.0000
L6	37.4167 - 0	1.045	48	0.2525	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
178'	Lightning Rod 5/8" x 5' on 6' pole	48	24.415	1.2517	0.0008	28714
170'	BXA-70063/6CF w/ Mount Pipe	48	22.329	1.2343	0.0005	18052
160'	7770.00	48	19.783	1.1928	0.0003	11000
150'	APXV18-206517LS w/ Mount Pipe	48	17.346	1.1281	0.0002	8884

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	178 - 164.25	122.436	20	6.2861	0.0043
L2	167.167 - 129.667	108.321	20	6.1514	0.0017
L3	133.5 - 96	68.390	20	5.0025	0.0009
L4	100.667 - 63.1667	38.266	20	3.6921	0.0005
L5	68.6667 - 31.1667	17.552	20	2.4204	0.0002
L6	37.4167 - 0	5.242	20	1.2668	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
178'	Lightning Rod 5/8" x 5' on 6' pole	20	122.436	6.2861	0.0043	5858
170'	BXA-70063/6CF w/ Mount Pipe	20	111.983	6.1966	0.0023	3682
160'	7770.00	20	99.223	5.9872	0.0013	2238
150'	APXV18-206517LS w/ Mount Pipe	20	87.007	5.6623	0.0011	1803

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L1	178 - 164.25 (1)	TP26x12.75x0.25	13'9"	0'	0.0	18.2024	-6.14	1064.84	0.006
L2	164.25 - 129.667 (2)	TP34.0625x22.6894x0.3125	37'6"	0'	0.0	32.3226	-14.61	1890.87	0.008
L3	129.667 - 96 (3)	TP41.75x32.2749x0.375	37'6"	0'	0.0	47.8431	-22.38	2798.82	0.008
L4	96 - 63.1667 (4)	TP49.0625x39.8209x0.375	37'6"	0'	0.0	56.3370	-31.67	3295.71	0.010
L5	63.1667 -	TP56.125x46.9571x0.375	37'6"	0'	0.0	64.537	-42.28	3775.46	0.011

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L6	31.1667 (5) 31.1667 - 0 (6)	TP62.9375x53.847x0.375	37'5-1/32"	0'	0.0	8 74.4650	-56.61	4356.20	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	178 - 164.25 (1)	TP26x12.75x0.25	77.57	636.00	0.122	0.00	636.00	0.000
L2	164.25 - 129.667 (2)	TP34.0625x22.6894x0.3125	688.25	1569.31	0.439	0.00	1569.31	0.000
L3	129.667 - 96 (3)	TP41.75x32.2749x0.375	1450.32	2844.52	0.510	0.00	2844.52	0.000
L4	96 - 63.1667 (4)	TP49.0625x39.8209x0.375	2303.49	3755.29	0.613	0.00	3755.29	0.000
L5	63.1667 - 31.1667 (5)	TP56.125x46.9571x0.375	3237.37	4686.54	0.691	0.00	4686.54	0.000
L6	31.1667 - 0 (6)	TP62.9375x53.847x0.375	4470.11	5847.24	0.764	0.00	5847.24	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	178 - 164.25 (1)	TP26x12.75x0.25	11.78	319.45	0.037	0.20	641.75	0.000
L2	164.25 - 129.667 (2)	TP34.0625x22.6894x0.3125	21.44	567.26	0.038	0.00	1618.88	0.000
L3	129.667 - 96 (3)	TP41.75x32.2749x0.375	24.94	839.65	0.030	0.00	2955.68	0.000
L4	96 - 63.1667 (4)	TP49.0625x39.8209x0.375	28.30	988.71	0.029	0.00	4098.32	0.000
L5	63.1667 - 31.1667 (5)	TP56.125x46.9571x0.375	31.33	1132.64	0.028	0.00	5378.32	0.000
L6	31.1667 - 0 (6)	TP62.9375x53.847x0.375	34.48	1306.86	0.026	0.00	7160.17	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	178 - 164.25 (1)	0.006	0.122	0.000	0.037	0.000	0.129	1.050	4.8.2
L2	164.25 - 129.667 (2)	0.008	0.439	0.000	0.038	0.000	0.448	1.050	4.8.2
L3	129.667 - 96 (3)	0.008	0.510	0.000	0.030	0.000	0.519	1.050	4.8.2
L4	96 - 63.1667 (4)	0.010	0.613	0.000	0.029	0.000	0.624	1.050	4.8.2
L5	63.1667 - 31.1667 (5)	0.011	0.691	0.000	0.028	0.000	0.703	1.050	4.8.2

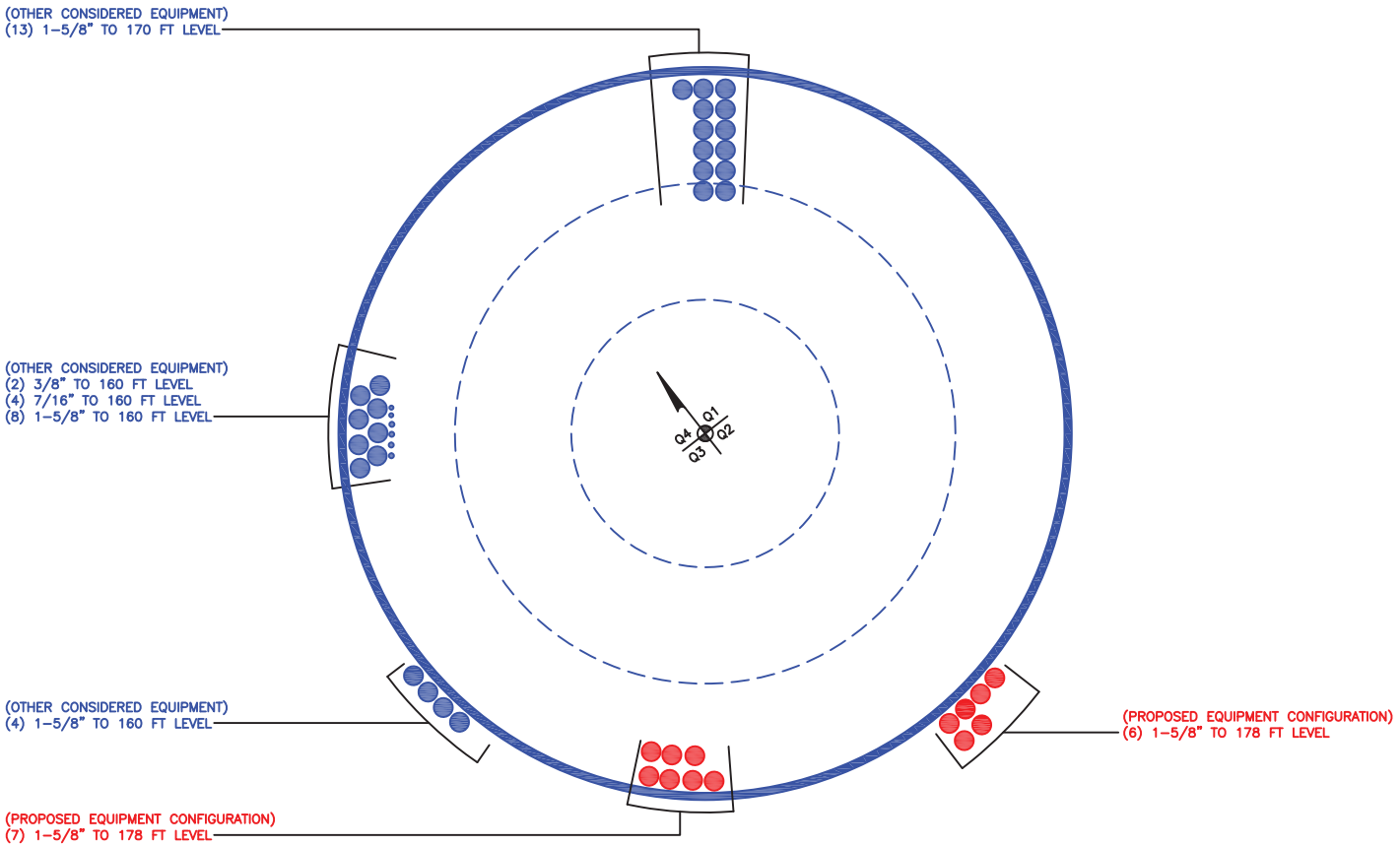
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L6	31.1667 - 0 (6)	0.013	0.764	0.000	0.026	0.000	0.778	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	178 - 164.25	Pole	TP26x12.75x0.25	1	-6.14	1118.08	12.3	Pass
L2	164.25 - 129.667	Pole	TP34.0625x22.6894x0.3125	2	-14.61	1985.41	42.6	Pass
L3	129.667 - 96	Pole	TP41.75x32.2749x0.375	3	-22.38	2938.76	49.4	Pass
L4	96 - 63.1667	Pole	TP49.0625x39.8209x0.375	4	-31.67	3460.50	59.4	Pass
L5	63.1667 - 31.1667	Pole	TP56.125x46.9571x0.375	5	-42.28	3964.23	66.9	Pass
L6	31.1667 - 0	Pole	TP62.9375x53.847x0.375	6	-56.61	4574.01	74.1	Pass
							Summary	
						Pole (L6)	74.1	Pass
						RATING =	**74.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 823666 TOWER ID:C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

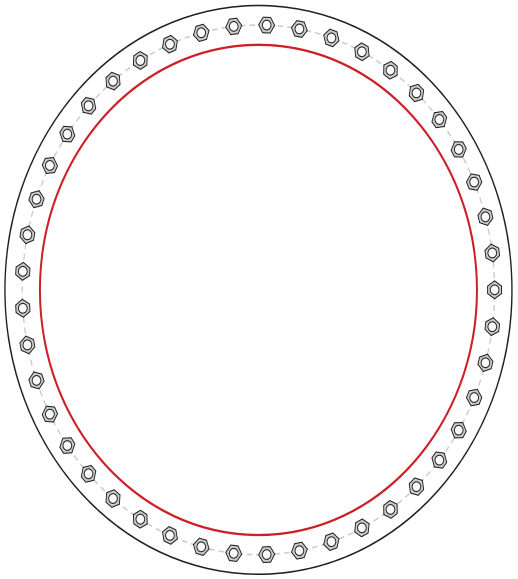
Monopole Base Plate Connection

Site Info	
BU #	823666
Site Name	Deep River/Rt 9
Order #	479818 R0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.25

Applied Loads	
Moment (kip-ft)	4470.11
Axial Force (kips)	56.61
Shear Force (kips)	34.48

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(45) 1-1/4" ø bolts (A687 N; Fy=105 ksi, Fu=125 ksi) on 68" BC

Base Plate Data

73" OD x 1.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

62.9375" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 71.37	ϕPn_c = 101.75	**Stress Rating**
Vu = 0.77	ϕVn = 30.52	**66.9%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**N/A**

Pier and Pad Foundation

BU # :	823666
Site Name:	Deep River/Rt 9
App. Number:	479818 R0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	57	kips
Base Shear, Vu_comp:	34	kips
Moment, M_u:	4470	ft-kips
Tower Height, **H**:	178	ft
BP Dist. Above Fdn, bp_{dist}:	2.5	in
Bolt Circle / Bearing Plate Width, **BC**:	68	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	187.16	34.00	**17.3%**	**Pass**
Bearing Pressure (ksf)	18.00	2.96	**16.4%**	**Pass**
*Overturning (kip*ft)*	6889.58	4613.08	**67.0%**	**Pass**
*Pad Flexure (kip*ft)*	4875.64	2182.17	**42.6%**	**Pass**
Pad Shear - 1-way (kips)	1436.12	253.55	**16.8%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.003	**1.5%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3989.84	0.00	**0.0%**	**Pass**

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

Soil Rating*:	**67.0%**
Structural Rating*:	**42.6%**

Pad Properties		
Depth, **D**:	3.5	ft
Pad Width, **W**:	29	ft
Pad Thickness, **T**:	4	ft
Pad Rebar Size (Bottom), **Sp**:	8	
Pad Rebar Quantity (Bottom), **mp**:	32	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δc:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	165	pcf
Ultimate Gross Bearing, Qult:	24.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	40	degrees
SPT Blow Count, N_{blows}:	50	
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	NA	ft

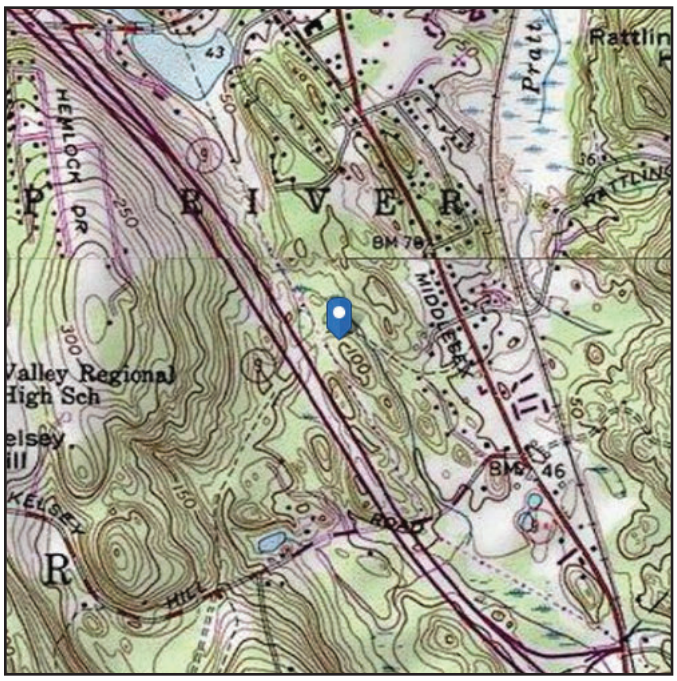
<--Toggle between Gross and Net

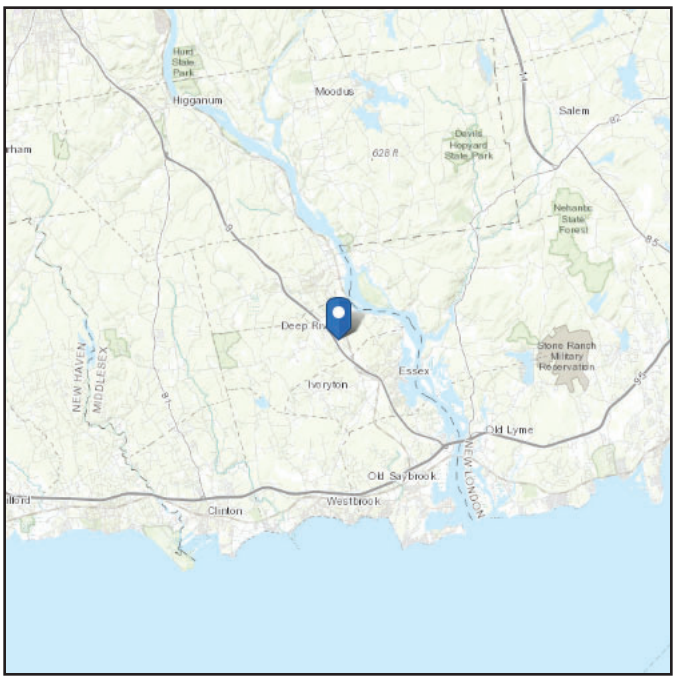
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 94.97 ft (NAVD 88)
Latitude: 41.372825
Longitude: -72.434436





Wind

Results:

Wind Speed:	130 Vmph
10-year MRI	79 Vmph
25-year MRI	88 Vmph
50-year MRI	97 Vmph
100-year MRI	106 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:	Thu May 09 2019

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

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

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

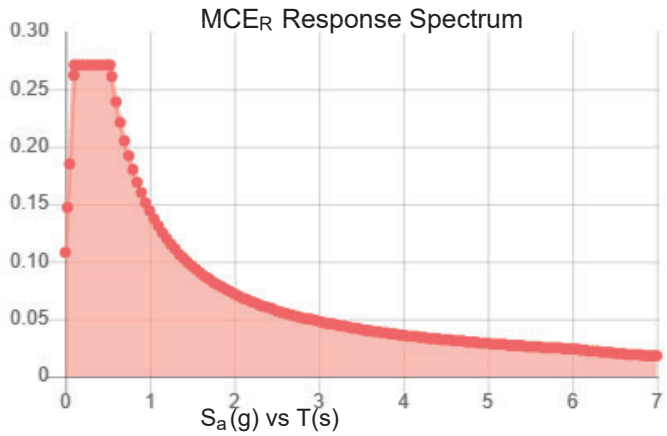
Seismic

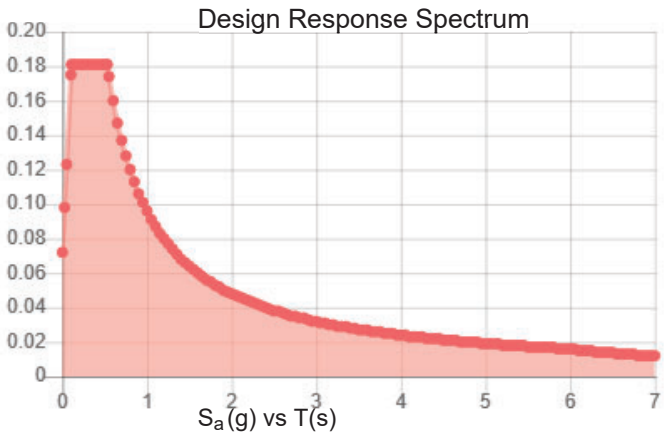
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.169	S_{DS} :	0.181
S_1 :	0.06	S_{D1} :	0.096
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.271	PGA_M :	0.137
S_{M1} :	0.144	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu May 09 2019

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu May 09 2019

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

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

Exhibit E

Mount Analysis

PAUL J. FORD & COMPANY

Date: May 3, 2019

Kevin Morrow
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:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11237C
	Carrier Site Name:	Deep River/Rt 9
Crown Castle Designation:	**Crown Castle BU Number:**	823666
	Crown Castle Site Name:	Deep River/Rt 9
	Crown Castle JDE Job Number:	559236
	Crown Castle Purchase Order Number:	1370694
	Crown Castle Order Number:	479818 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37519-1564.002.7190
Site Data:	**15 Pent Rd., Deep River, Middlesex County, CT** **Latitude 41.443056°, Longitude -72.506222°**	
Structure Information:	**Tower Height & Type:**	**178 Foot Monopole**
	Mount Elevation:	**178 Foot**
	Mount Type:	**(1) 16.5 Foot Platform**

Dear Kevin Morrow,

Paul J Ford and Company is pleased to submit this "Mount Analysis Report" to determine the structural integrity of the T-Mobile 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:

16.5' Platform **SUFFICIENT***

***The mount has sufficient capacity once the changes, as described in Section 4.1 Recommendations of this report, are completed.**

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

Respectfully submitted by:

Steven Pozz, E.I.
Structural Designer
spozz@pauljford.com

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

2019.05.03
17:21:17-04'00'

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1) INTRODUCTION

The existing mount under consideration is (1) 16.5' Platform mount 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:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.000
Topographic Factor at Mount:	1.000
Ice Thickness:	1.50 in
Wind Speed with Ice:	50 mph
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
178	177	3	EMS Wireless	RR90-17-02DP	(1) 16.5' Platform
		3	RFS Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	KRY 112 144/1	
		3	Ericsson	KRY 112 489/2	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Photos	Dated: 01/30/2019	-	CCISites
TIA Inspection	Dated: 11/03/2013	-	CCISites
Order	ID: 479818 Rev. 0 Dated: 04/17/2019	-	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.

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

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 Table 1.*
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*
   - *g) U-Bolts* — *SAE J429 (GR 2)*
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 the TIA inspection referenced in Table 2. 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.*

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	178	68.2	Pass
1	Bracing Members		58.4	Pass
1	Grating Support Members		43.6	Pass
1	Standoff Members		48.8	Pass
1	Corner Plates		55.0	Pass
1	Mount Pipes		99.3	Pass
1	Mount to Tower Connection		85.3	Pass

Mount Rating (max from all components) =	99.3%

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. In order for the results of the analysis to be considered valid, modification listed below must be completed.

- Install a handrail kit made up of (3) P2 STD (2.38" O.D. X 0.154") pipes with total lengths match the existing boom lengths and (3) SitePro-1 AHCP Angle Handrail Corner Plate Kits or EOR Approved Equivalents. See Appendix D for details.
- Install an additional 6-ft long, P2 STD (2.38" O.D. x 0.154") mount pipe on (2) Sectors. See Appendix D for details.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

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.

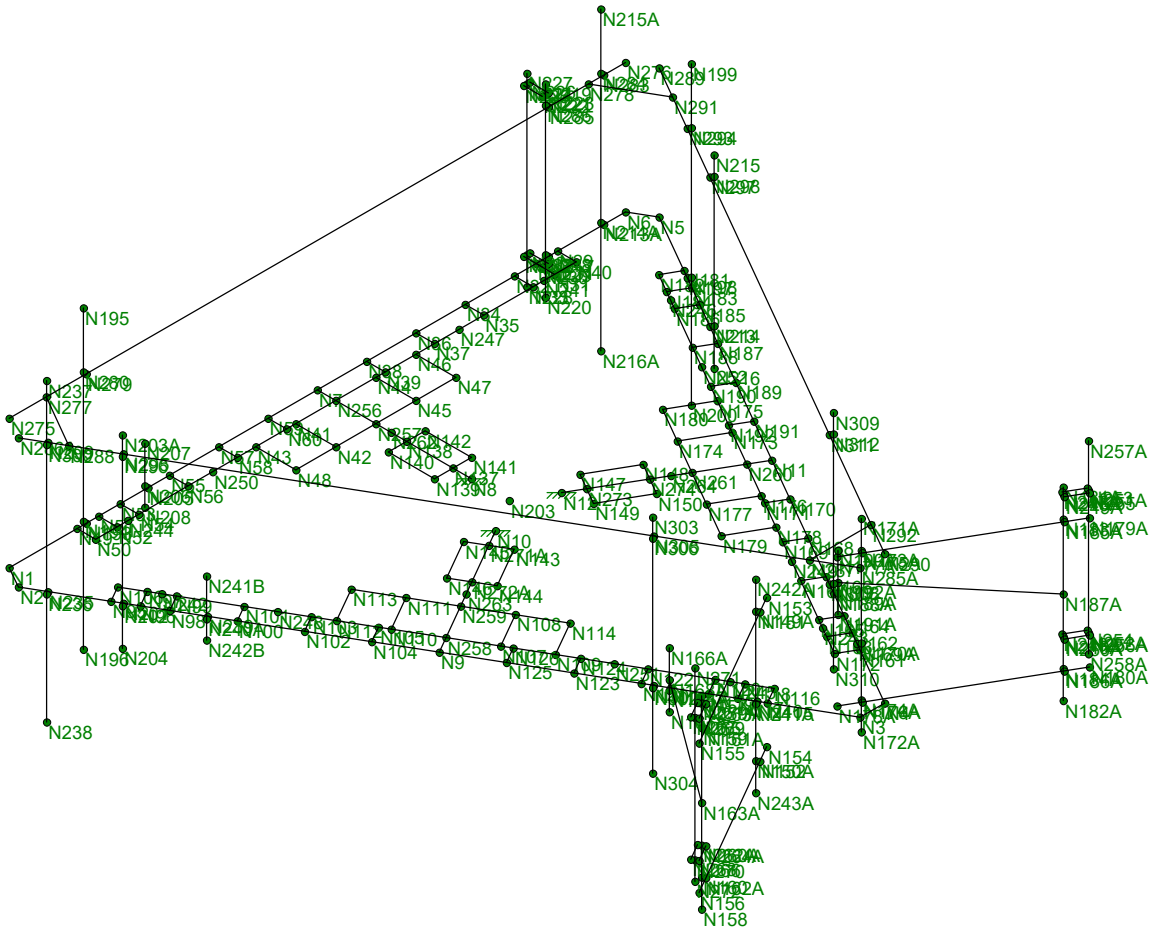
4) The standard of care for all Professional Engineering Services performed or furnished by Paul J. Ford and Company under this project will be the skill and care used by members of the Consultant's profession practicing under similar circumstances at the same time and in the same locality.

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.

****

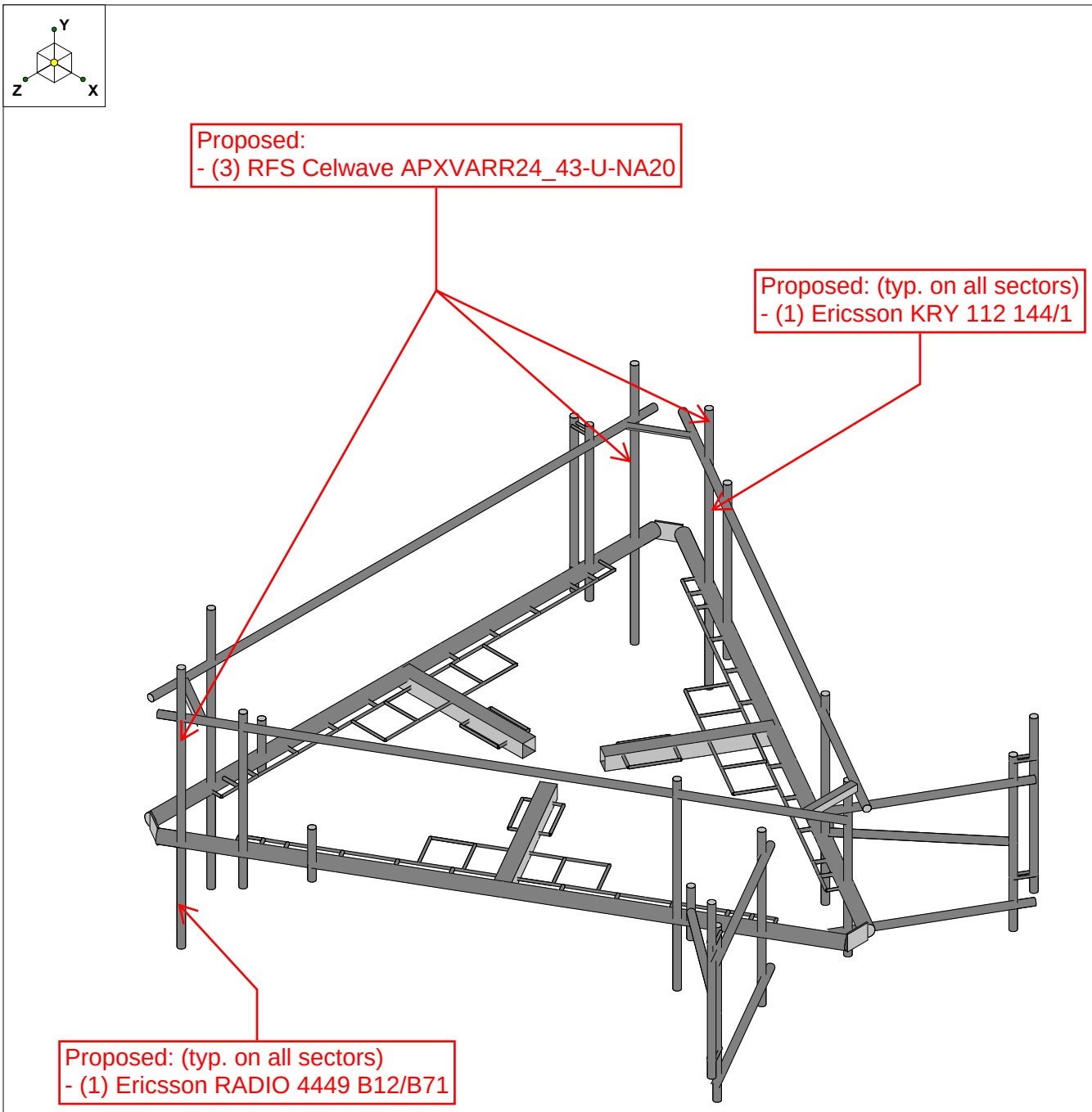
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 1
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_Wind Load.r3d



Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 2
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_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 # 37519-1564.002.7190
By STP

Analysis 30 degrees

Date: 05/03/19

v1.0, Effective 04/03/2018

Mount Loading per TIA-222-H

Structure Information

Mount Type =	3 Sectors	
Mount Elev, z =	178	ft
Ground Elev, z_s =	95	ft
Wind Speed =	130	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 =	1.17		Calculated Value
Ke =	1.00		Ground Elevation Factor
K_z =	1.17		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=	42.95	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=	7.08	psf	Ice Velocity Pressure (Section 2.6.9.6)
K_{iz} =	1.18		Ice Escalation Factor (Section 2.6.8)
T_{iz} =	1.78	in	Factored Ice Thickness (Section 2.6.8)
h =	1.00	in	Bar Grating Height
W_i =	12.95	psf	Grating Ice Weight

Wind Pressures

Pressure =	42.954	psf
Ice Pressure =	7.085	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	A1	83.0	13	96.0	B	B1	52.0	8	60.0	C	C1	83.0	13	96.0	D			
A	A4	52.0	8	60.0	B	B4	83.0	13	96.0	C	C4	70.0	26	96.0	D			
A					B					C					D			
A (2)	A1	56.0	56	96.0	B (2)	B1	24.0	24	60.0	C (2)	C1	56.0	56	96.0	D			
A (3)	A1	72	72	96.0	B (3)	B1	48	48	60.0	C (3)	C1	72	72	96.0	D			
A (2)	A4	48	48	60.0	B (2)	B4	56	56	96.0	C (2)	C4	56	56	96.0	D			
A					B					C					D			
A					B					C					D			
A					B					C					D			
A					B					C					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	EMS WIRELESS	RR90-17-02DP	56	8	2.75	Flat	13.5	A4	B1	C4			
2	RFS CELWAVE	APXVAARR24_43-U-NA20	95.9	24	8.7	Flat	128	A1	B4	C1			
3	ERICSSON	KRY 112 144/1	7	6	3	Flat	11	A1(2)	B1(2)	C1(2)			
4	ERICSSON	KRY 112 489/2	11	6.1	3.94	Flat	15.4	A1(3)	B1(3)	C1(3)			
5	ERICSSON	RADIO 4449 B12/B71	15	13.2	9.3	Flat	74	A4(2)	B4(2)	C4(2)			
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													

Dishes

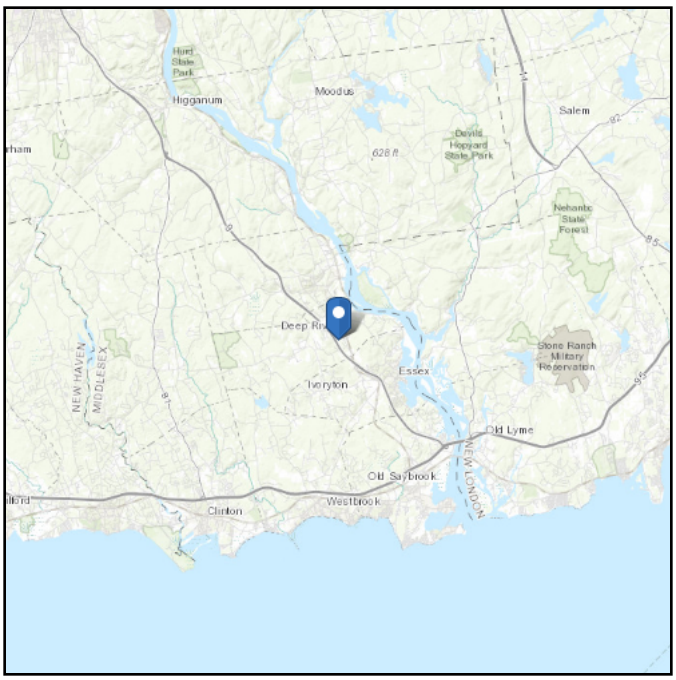
Item	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Dish Attachment Locations					
						Label	Label	Label	Label	Label	Label
1											
2											
3											
4											
5											

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 94.97 ft (NAVD 88)
Latitude: 41.372825
Longitude: -72.434436



Wind

Results:

Wind Speed:	130 Vmph
10-year MRI	79 Vmph
25-year MRI	88 Vmph
50-year MRI	97 Vmph
100-year MRI	106 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri Apr 26 2019

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

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

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

Ice

Results:

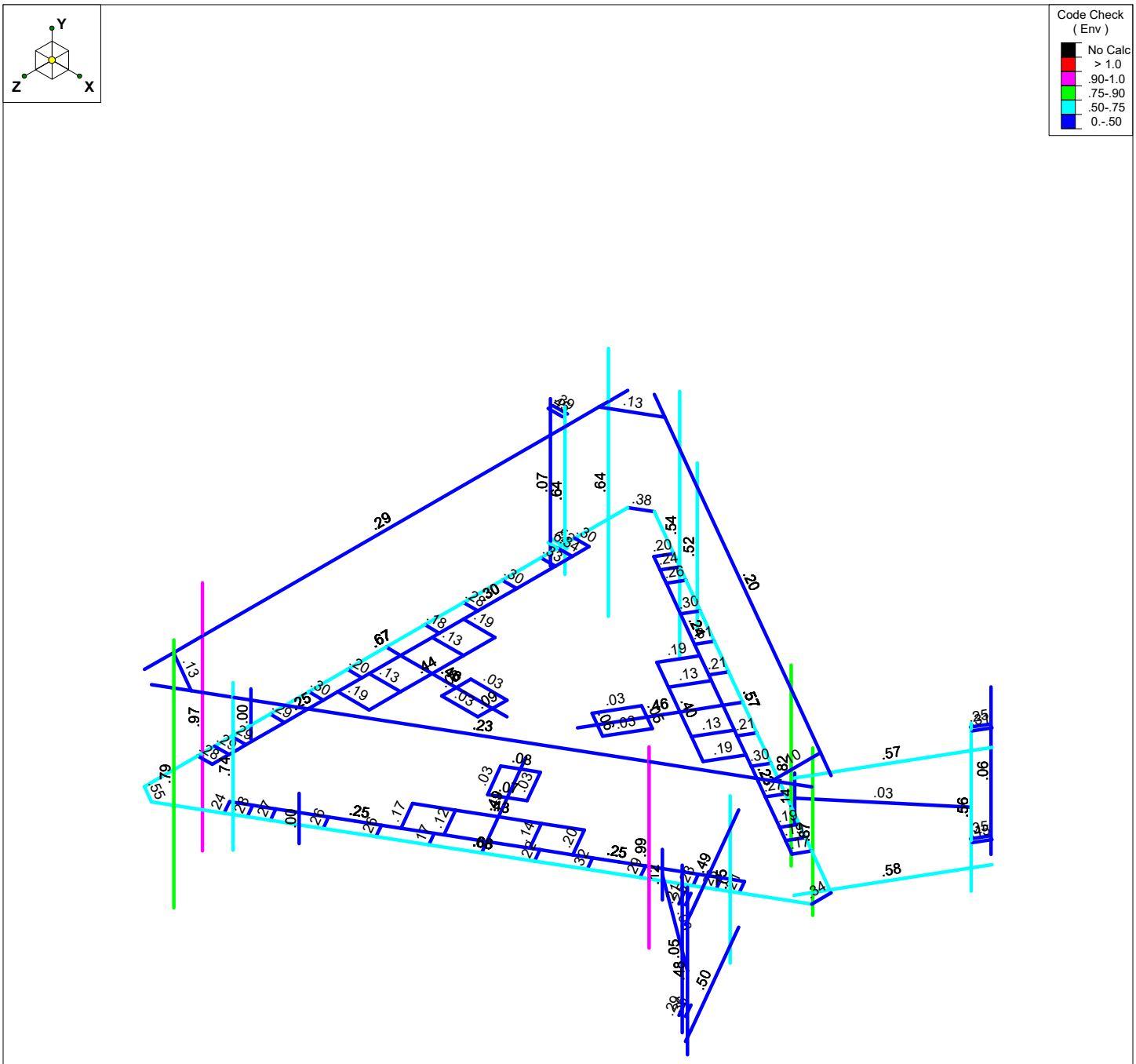
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Apr 26 2019

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

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

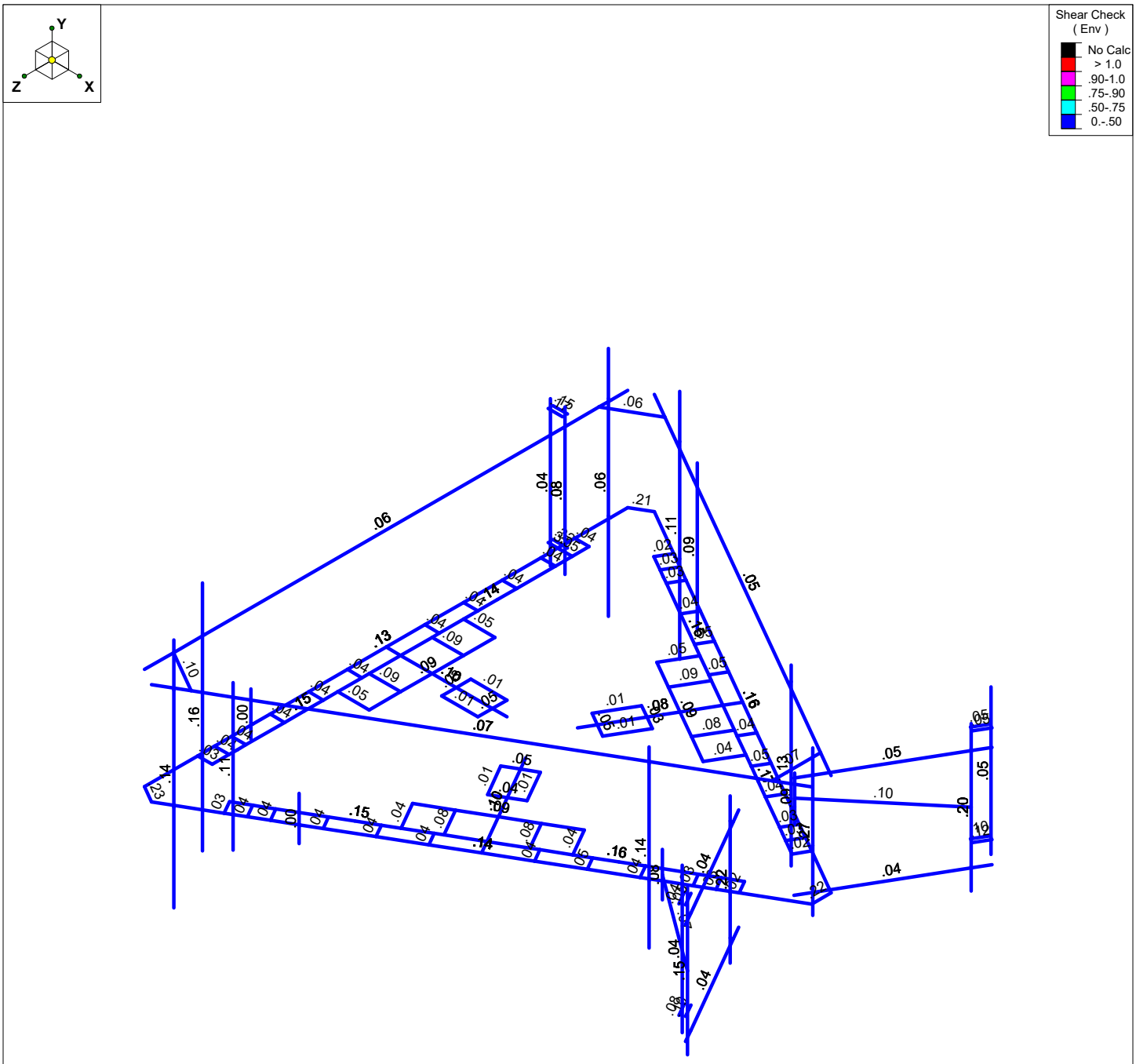
APPENDIX C

SOFTWARE ANALYSIS OUTPUT



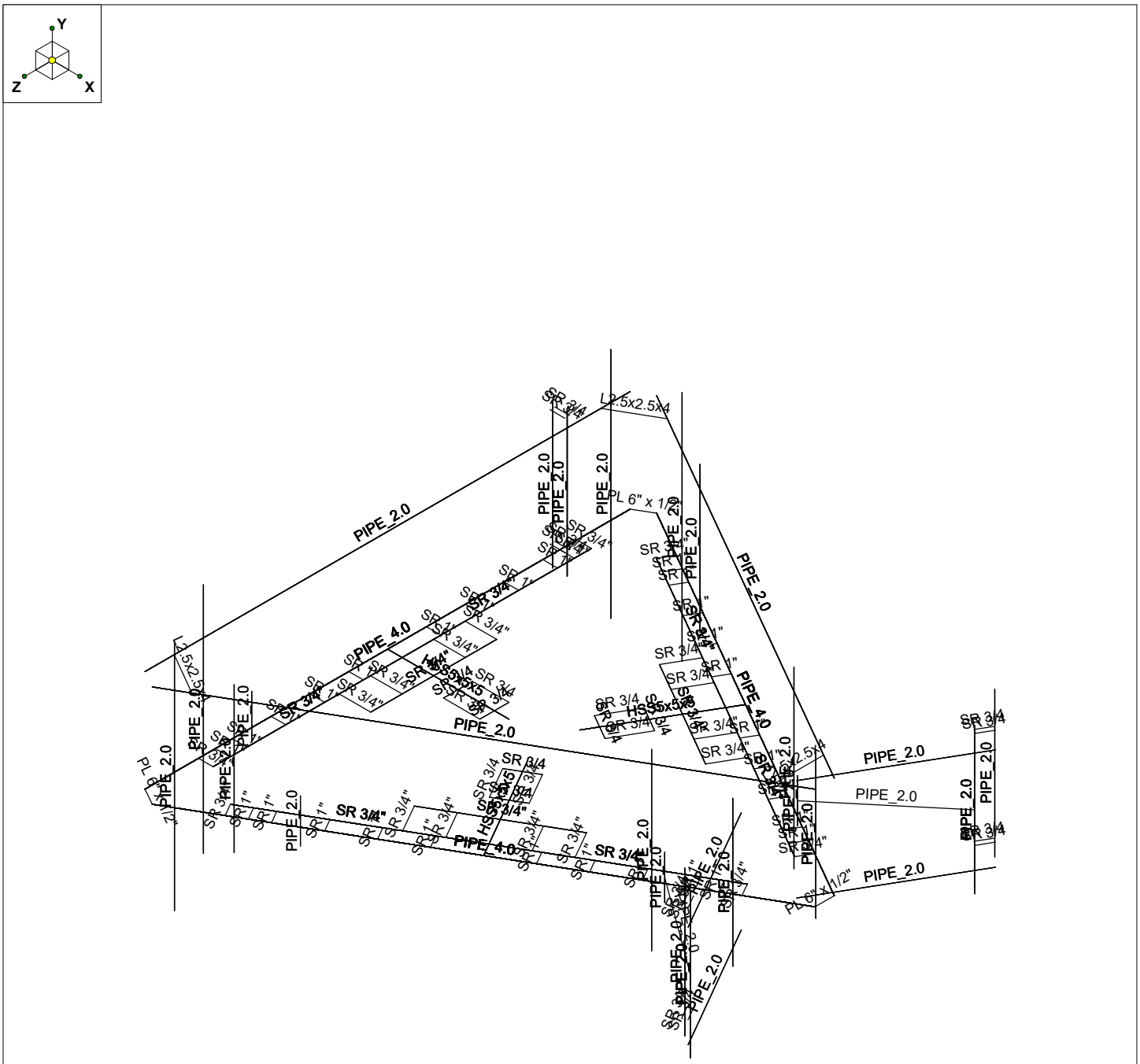
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 3
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_Wind Load.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 4
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_Wind Load.r3d



Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 5
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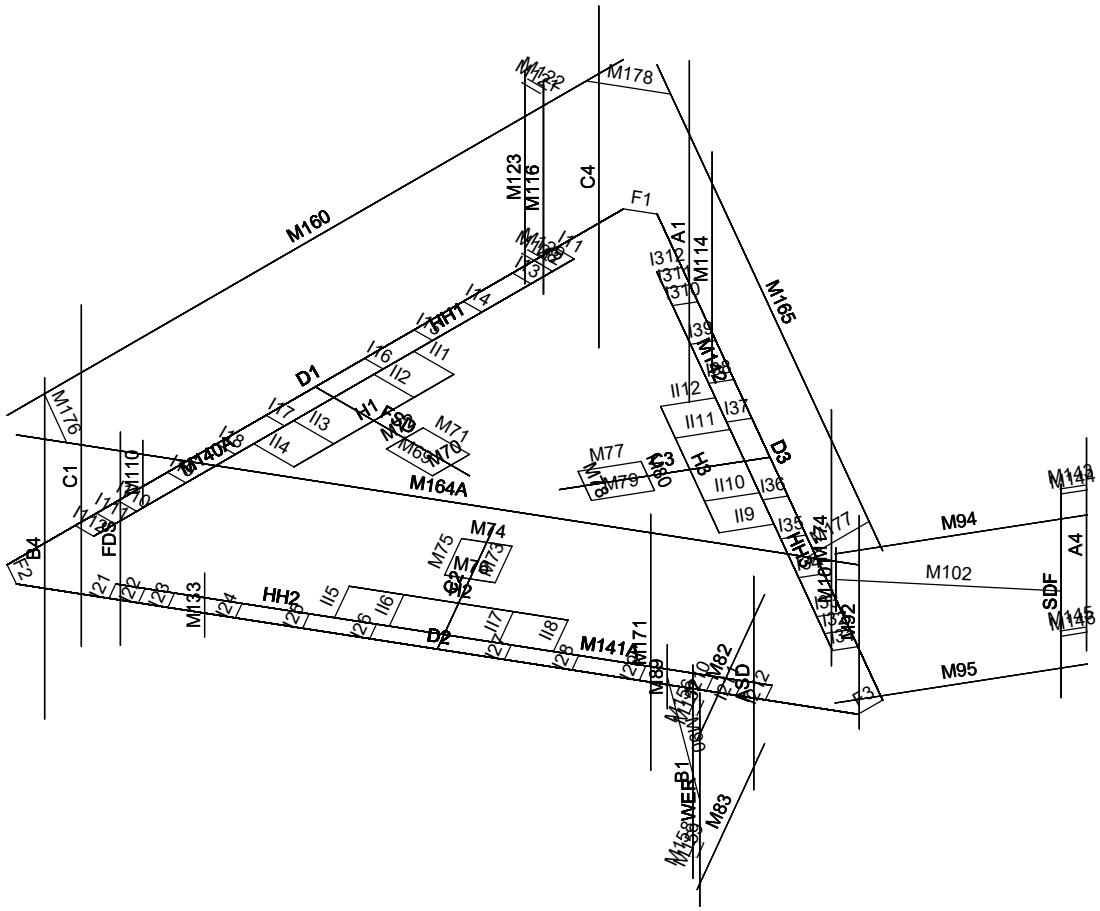
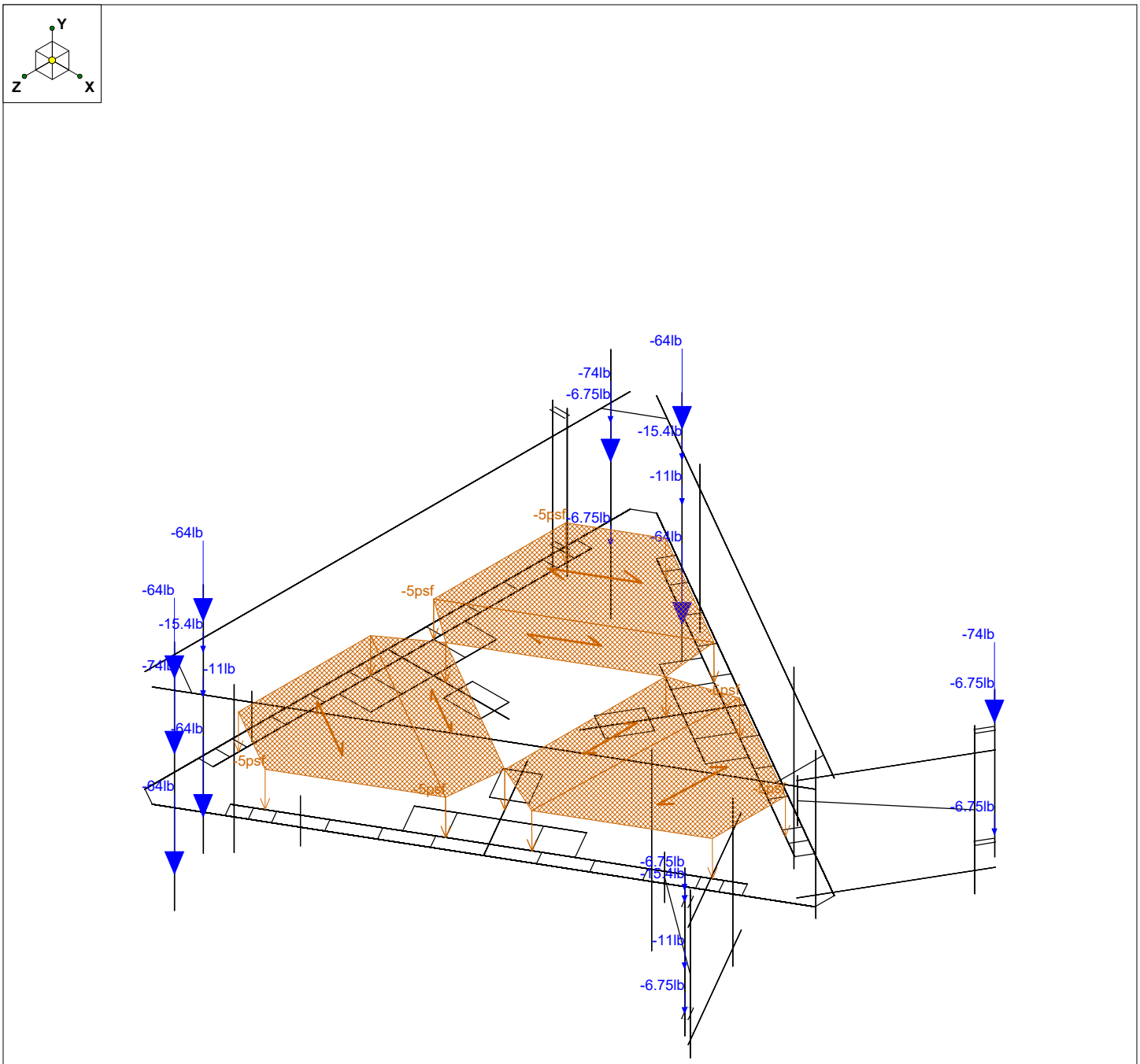


Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 6
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_Wind Load.r3d



Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 7
STP		May 3, 2019 at 12:49 PM
37519-1564.002.7190		37519-1564_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?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	D1	N6	N1			PIPE 4.0	None	None	A53 Gr. B (35 ksi)	Typical
2	F2	N1	N2			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
3	D2	N2	N3			PIPE 4.0	None	None	A53 Gr. B (35 ksi)	Typical
4	F3	N3	N4			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
5	D3	N4	N5			PIPE 4.0	None	None	A53 Gr. B (35 ksi)	Typical
6	F1	N5	N6			PL 6" x 1/2"	None	None	A36 Gr.36	Typical
7	FSD	N7	N8			HSS5x5x5	None	None	A500 Gr.46	Typical
8	C2	N9	N10			HSS5x5x5	None	None	A500 Gr.46	Typical
9	C3	N11	N12			HSS5x5x5	None	None	A500 Gr.46	Typical
10	I112	N49	N50			SR 3/4"	None	None	A36 Gr.36	Typical
11	I11	N29	N40			SR 3/4"	None	None	A36 Gr.36	Typical
12	I12	N30	N31			SR 1"	None	None	A36 Gr.36	Typical
13	I13	N32	N33			SR 1"	None	None	A36 Gr.36	Typical
14	I14	N34	N35			SR 1"	None	None	A36 Gr.36	Typical
15	I15	N36	N37			SR 1"	None	None	A36 Gr.36	Typical
16	I16	N38	N39			SR 1"	None	None	A36 Gr.36	Typical
17	HH1	N40	N256			SR 3/4"	None	None	A36 Gr.36	Typical
18	II3	N41	N42			SR 3/4"	None	None	A36 Gr.36	Typical
19	II4	N43	N48			SR 3/4"	None	None	A36 Gr.36	Typical
20	II2	N44	N45			SR 3/4"	None	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
21	II1	N46	N47			SR 3/4"	None	None	A36 Gr.36	Typical
22	H1	N47	N48			SR 3/4"	None	None	A36 Gr.36	Typical
23	I111	N51	N52			SR 1"	None	None	A36 Gr.36	Typical
24	I110	N53	N54			SR 1"	None	None	A36 Gr.36	Typical
25	I19	N55	N56			SR 1"	None	None	A36 Gr.36	Typical
26	I18	N57	N58			SR 1"	None	None	A36 Gr.36	Typical
27	I17	N59	N60			SR 1"	None	None	A36 Gr.36	Typical
28	I212	N115	N116			SR 3/4"	None	None	A36 Gr.36	Typical
29	I21	N95	N106			SR 3/4"	None	None	A36 Gr.36	Typical
30	I22	N96	N97			SR 1"	None	None	A36 Gr.36	Typical
31	I23	N98	N99			SR 1"	None	None	A36 Gr.36	Typical
32	I24	N100	N101			SR 1"	None	None	A36 Gr.36	Typical
33	I25	N102	N103			SR 1"	None	None	A36 Gr.36	Typical
34	I26	N104	N105			SR 1"	None	None	A36 Gr.36	Typical
35	HH2	N106	N258			SR 3/4"	None	None	A36 Gr.36	Typical
36	II7	N107	N108			SR 3/4"	None	None	A36 Gr.36	Typical
37	II8	N109	N114			SR 3/4"	None	None	A36 Gr.36	Typical
38	II6	N110	N111			SR 3/4"	None	None	A36 Gr.36	Typical
39	II5	N112	N113			SR 3/4"	None	None	A36 Gr.36	Typical
40	H2	N113	N114			SR 3/4"	None	None	A36 Gr.36	Typical
41	I211	N117	N118			SR 1"	None	None	A36 Gr.36	Typical
42	I210	N119	N120			SR 1"	None	None	A36 Gr.36	Typical
43	I29	N121	N122			SR 1"	None	None	A36 Gr.36	Typical
44	I28	N123	N124			SR 1"	None	None	A36 Gr.36	Typical
45	I27	N125	N126			SR 1"	None	None	A36 Gr.36	Typical
46	I312	N181	N182			SR 3/4"	None	None	A36 Gr.36	Typical
47	I31	N161	N172			SR 3/4"	None	None	A36 Gr.36	Typical
48	I32	N162	N163			SR 1"	None	None	A36 Gr.36	Typical
49	I33	N164	N165			SR 1"	None	None	A36 Gr.36	Typical
50	I34	N166	N167			SR 1"	None	None	A36 Gr.36	Typical
51	I35	N168	N169			SR 1"	None	None	A36 Gr.36	Typical
52	I36	N170	N171			SR 1"	None	None	A36 Gr.36	Typical
53	HH3	N172	N260			SR 3/4"	None	None	A36 Gr.36	Typical
54	II11	N173	N174			SR 3/4"	None	None	A36 Gr.36	Typical
55	II12	N175	N180			SR 3/4"	None	None	A36 Gr.36	Typical
56	II10	N176	N177			SR 3/4"	None	None	A36 Gr.36	Typical
57	II9	N178	N179			SR 3/4"	None	None	A36 Gr.36	Typical
58	H3	N179	N180			SR 3/4"	None	None	A36 Gr.36	Typical
59	I311	N183	N184			SR 1"	None	None	A36 Gr.36	Typical
60	I310	N185	N186			SR 1"	None	None	A36 Gr.36	Typical
61	I39	N187	N188			SR 1"	None	None	A36 Gr.36	Typical
62	I38	N189	N190			SR 1"	None	None	A36 Gr.36	Typical
63	I37	N191	N192			SR 1"	None	None	A36 Gr.36	Typical
64	M117	N240	N241A			RIGID	None	None	RIGID	Typical
65	ASD	N243A	N242A			PIPE 2.0	None	None	A53 Gr. B (35 ksi)	Typical
66	M140A	N256	N50			SR 3/4"	None	None	A36 Gr.36	Typical
67	M141A	N258	N116			SR 3/4"	None	None	A36 Gr.36	Typical
68	M142	N260	N182			SR 3/4"	None	None	A36 Gr.36	Typical
69	M69	N140	N139			SR 3/4	None	None	A36 Gr.36	Typical
70	M70	N139	N141			SR 3/4	None	None	A36 Gr.36	Typical
71	M71	N141	N142			SR 3/4	None	None	A36 Gr.36	Typical
72	M72	N142	N140			SR 3/4	None	None	A36 Gr.36	Typical
73	M73	N144	N143			SR 3/4	None	None	A36 Gr.36	Typical
74	M74	N143	N145			SR 3/4	None	None	A36 Gr.36	Typical
75	M75	N145	N146			SR 3/4	None	None	A36 Gr.36	Typical
76	M76	N146	N144			SR 3/4	None	None	A36 Gr.36	Typical
77	M77	N148	N147			SR 3/4	None	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
78	M78	N147	N149			SR 3/4	None	None	A36 Gr.36	Typical
79	M79	N149	N150			SR 3/4	None	None	A36 Gr.36	Typical
80	M80	N150	N148			SR 3/4	None	None	A36 Gr.36	Typical
81	WER	N158	N157			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
82	M82	N155	N153			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
83	M83	N156	N154			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
84	M84	N161A	N159			RIGID	None	None	RIGID	Typical
85	M85	N162A	N160			RIGID	None	None	RIGID	Typical
86	M86	N151	N149A			RIGID	None	None	RIGID	Typical
87	M87	N152	N150A			RIGID	None	None	RIGID	Typical
88	M88	N165A	N164A			RIGID	None	None	RIGID	Typical
89	M89	N167A	N166A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
90	M90	N163A	N168A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
91	M91	N169A	N170A			RIGID	None	None	RIGID	Typical
92	M92	N172A	N171A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
93	SDF	N182A	N181A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
94	M94	N179A	N177A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
95	M95	N180A	N178A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
96	M96	N185A	N183A			RIGID	None	None	RIGID	Typical
97	M97	N186A	N184A			RIGID	None	None	RIGID	Typical
98	M98	N175A	N173A			RIGID	None	None	RIGID	Typical
99	M99	N176A	N174A			RIGID	None	None	RIGID	Typical
100	M100	N189A	N188A			RIGID	None	None	RIGID	Typical
101	M101	N191A	N190A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
102	M102	N187A	N192A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
103	M103	N194	N193			RIGID	None	None	RIGID	Typical
104	C1	N196	N195			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
105	M105	N198	N197			RIGID	None	None	RIGID	Typical
106	A1	N200	N199			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
107	M107	N202	N201			RIGID	None	None	RIGID	Typical
108	FDS	N204	N203A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
109	M109	N206	N205			RIGID	None	None	RIGID	Typical
110	M110	N208	N207			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
111	M113	N214	N213			RIGID	None	None	RIGID	Typical
112	M114	N216	N215			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
113	M113A	N214A	N213A			RIGID	None	None	RIGID	Typical
114	C4	N216A	N215A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
115	M115	N218	N217			RIGID	None	None	RIGID	Typical
116	M116	N220	N219			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
117	M117A	N221	N222			RIGID	None	None	RIGID	Typical
118	M118	N221	N223			RIGID	None	None	RIGID	Typical
119	M119	N224	N225			RIGID	None	None	RIGID	Typical
120	M120	N224	N226			RIGID	None	None	RIGID	Typical
121	M121	N222	N225			SR 3/4	None	None	A36 Gr.36	Typical
122	M122	N223	N226			SR 3/4	None	None	A36 Gr.36	Typical
123	M123	N228	N227			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
124	M124	N229	N230			RIGID	None	None	RIGID	Typical
125	M125	N229	N231			RIGID	None	None	RIGID	Typical
126	M126	N232	N233			RIGID	None	None	RIGID	Typical
127	M127	N232	N234			RIGID	None	None	RIGID	Typical
128	M128	N230	N233			SR 3/4	None	None	A36 Gr.36	Typical
129	M129	N231	N234			SR 3/4	None	None	A36 Gr.36	Typical
130	M130	N236	N235			RIGID	None	None	RIGID	Typical
131	B4	N238	N237			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
132	M132	N240A	N239			RIGID	None	None	RIGID	Typical
133	M133	N242B	N241B			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
134	M135	N245A	N247A			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
135	M136	N245A	N249A			RIGID	None	None	RIGID	Typical
136	M137	N246A	N248A			RIGID	None	None	RIGID	Typical
137	M138	N246A	N250A			RIGID	None	None	RIGID	Typical
138	M139	N251A	N253			RIGID	None	None	RIGID	Typical
139	M140	N251A	N255			RIGID	None	None	RIGID	Typical
140	M141	N252A	N254			RIGID	None	None	RIGID	Typical
141	M142A	N252A	N256A			RIGID	None	None	RIGID	Typical
142	M143	N247A	N253			SR 3/4	None	None	A36 Gr.36	Typical
143	M144	N249A	N255			SR 3/4	None	None	A36 Gr.36	Typical
144	M145	N248A	N254			SR 3/4	None	None	A36 Gr.36	Typical
145	M146	N250A	N256A			SR 3/4	None	None	A36 Gr.36	Typical
146	A4	N258A	N257A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
147	M148	N259A	N261A			RIGID	None	None	RIGID	Typical
148	M149	N259A	N263A			RIGID	None	None	RIGID	Typical
149	M150	N260A	N262A			RIGID	None	None	RIGID	Typical
150	M151	N260A	N264A			RIGID	None	None	RIGID	Typical
151	M152	N265	N267			RIGID	None	None	RIGID	Typical
152	M153	N265	N269			RIGID	None	None	RIGID	Typical
153	M154	N266	N268			RIGID	None	None	RIGID	Typical
154	M155	N266	N270			RIGID	None	None	RIGID	Typical
155	M156	N261A	N267			SR 3/4	None	None	A36 Gr.36	Typical
156	M157	N263A	N269			SR 3/4	None	None	A36 Gr.36	Typical
157	M158	N262A	N268			SR 3/4	None	None	A36 Gr.36	Typical
158	M159	N264A	N270			SR 3/4	None	None	A36 Gr.36	Typical
159	B1	N272	N271			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
160	M160	N275	N276			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
161	M161	N280	N279			RIGID	None	None	RIGID	Typical
162	M163	N284	N283			RIGID	None	None	RIGID	Typical
163	M164	N286	N285			RIGID	None	None	RIGID	Typical
164	M164A	N285A	N286A			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
165	M165	N289	N290			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
166	M166	N294	N293			RIGID	None	None	RIGID	Typical
167	M167	N296	N295			RIGID	None	None	RIGID	Typical
168	M168	N298	N297			RIGID	None	None	RIGID	Typical
169	M169	N300	N299			RIGID	None	None	RIGID	Typical
170	M170	N302	N301			RIGID	None	None	RIGID	Typical
171	M171	N304	N303			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
172	M172	N306	N305			RIGID	None	None	RIGID	Typical
173	M173	N308	N307			RIGID	None	None	RIGID	Typical
174	M174	N310	N309			PIPE_2.0	None	None	A53 Gr. B (35 ksi)	Typical
175	M175	N312	N311			RIGID	None	None	RIGID	Typical
176	M176	N277	N288		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
177	M177	N287	N292		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical
178	M178	N291	N278		180	L2.5x2.5x4	None	None	A36 Gr.36	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	D1						Yes			None
2	F2						Yes			None
3	D2						Yes			None
4	F3						Yes			None
5	D3						Yes			None
6	F1						Yes			None
7	FSD						Yes			None
8	C2						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
9	C3						Yes			None
10	I112						Yes			None
11	I11						Yes			None
12	I12						Yes			None
13	I13						Yes			None
14	I14						Yes			None
15	I15						Yes			None
16	I16						Yes			None
17	HH1						Yes			None
18	II3						Yes			None
19	II4						Yes			None
20	II2						Yes			None
21	II1						Yes			None
22	H1						Yes			None
23	I111						Yes			None
24	I110						Yes			None
25	I19						Yes			None
26	I18						Yes			None
27	I17						Yes			None
28	I212						Yes			None
29	I21						Yes			None
30	I22						Yes			None
31	I23						Yes			None
32	I24						Yes			None
33	I25						Yes			None
34	I26						Yes			None
35	HH2						Yes			None
36	II7						Yes			None
37	II8						Yes			None
38	II6						Yes			None
39	II5						Yes			None
40	H2						Yes			None
41	I211						Yes			None
42	I210						Yes			None
43	I29						Yes			None
44	I28						Yes			None
45	I27						Yes			None
46	I312						Yes			None
47	I31						Yes			None
48	I32						Yes			None
49	I33						Yes			None
50	I34						Yes			None
51	I35						Yes			None
52	I36						Yes			None
53	HH3						Yes			None
54	II11						Yes			None
55	II12						Yes			None
56	II10						Yes			None
57	II9						Yes			None
58	H3						Yes			None
59	I311						Yes			None
60	I310						Yes			None
61	I39						Yes			None
62	I38						Yes			None
63	I37						Yes			None
64	M117						Yes			None
65	ASD						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
66	M140A						Yes			None
67	M141A						Yes			None
68	M142						Yes			None
69	M69						Yes			None
70	M70						Yes			None
71	M71						Yes			None
72	M72						Yes			None
73	M73						Yes			None
74	M74						Yes			None
75	M75						Yes			None
76	M76						Yes			None
77	M77						Yes			None
78	M78						Yes			None
79	M79						Yes			None
80	M80						Yes			None
81	WER						Yes			None
82	M82						Yes			None
83	M83						Yes			None
84	M84						Yes			None
85	M85						Yes			None
86	M86		OOOXOX				Yes			None
87	M87		OOOXOX				Yes			None
88	M88						Yes			None
89	M89						Yes			None
90	M90	BenPIN	BenPIN				Yes			None
91	M91						Yes			None
92	M92						Yes			None
93	SDF						Yes			None
94	M94						Yes			None
95	M95						Yes			None
96	M96						Yes			None
97	M97						Yes			None
98	M98		OOOXOX				Yes			None
99	M99		OOOXOX				Yes			None
100	M100						Yes			None
101	M101						Yes			None
102	M102	BenPIN	BenPIN				Yes			None
103	M103						Yes			None
104	C1						Yes			None
105	M105						Yes			None
106	A1						Yes			None
107	M107						Yes			None
108	FDS						Yes			None
109	M109						Yes			None
110	M110						Yes			None
111	M113						Yes			None
112	M114						Yes			None
113	M113A						Yes			None
114	C4						Yes			None
115	M115						Yes			None
116	M116						Yes			None
117	M117A						Yes			None
118	M118						Yes			None
119	M119						Yes			None
120	M120						Yes			None
121	M121						Yes			None
122	M122						Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
123	M123						Yes			None
124	M124						Yes			None
125	M125						Yes			None
126	M126						Yes			None
127	M127						Yes			None
128	M128						Yes			None
129	M129						Yes			None
130	M130						Yes			None
131	B4						Yes			None
132	M132						Yes			None
133	M133						Yes			None
134	M135						Yes			None
135	M136						Yes			None
136	M137						Yes			None
137	M138						Yes			None
138	M139						Yes			None
139	M140						Yes			None
140	M141						Yes			None
141	M142A						Yes			None
142	M143						Yes			None
143	M144						Yes			None
144	M145						Yes			None
145	M146						Yes			None
146	A4						Yes			None
147	M148						Yes			None
148	M149						Yes			None
149	M150						Yes			None
150	M151						Yes			None
151	M152						Yes			None
152	M153						Yes			None
153	M154						Yes			None
154	M155						Yes			None
155	M156						Yes			None
156	M157						Yes			None
157	M158						Yes			None
158	M159						Yes			None
159	B1						Yes			None
160	M160						Yes			None
161	M161		OOOXOX				Yes			None
162	M163		OOOXOX				Yes			None
163	M164		OOOXOX				Yes			None
164	M164A						Yes			None
165	M165						Yes			None
166	M166		OOOXOX				Yes			None
167	M167		OOOXOX				Yes			None
168	M168		OOOXOX				Yes			None
169	M169		OOOXOX				Yes			None
170	M170						Yes			None
171	M171						Yes			None
172	M172		OOOXOX				Yes			None
173	M173						Yes			None
174	M174						Yes			None
175	M175		OOOXOX				Yes			None
176	M176	OOOOOX	OOOOOX				Yes			None
177	M177	OOOOOX	OOOOOX				Yes			None
178	M178	OOOOOX	OOOOOX				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	D1	PIPE 4.0	200			Lbyy						Lateral
2	F2	PL 6" x 1/2"	8			Lbyy						Lateral
3	D2	PIPE 4.0	200			Lbyy						Lateral
4	F3	PL 6" x 1/2"	8			Lbyy						Lateral
5	D3	PIPE 4.0	200			Lbyy						Lateral
6	F1	PL 6" x 1/2"	8			Lbyy						Lateral
7	FSD	HSS5x5x5	50			Lbyy						Lateral
8	C2	HSS5x5x5	50			Lbyy						Lateral
9	C3	HSS5x5x5	50			Lbyy						Lateral
10	I112	SR 3/4"	6			Lbyy						Lateral
11	I11	SR 3/4"	6			Lbyy						Lateral
12	I12	SR 1"	6			Lbyy						Lateral
13	I13	SR 1"	6			Lbyy						Lateral
14	I14	SR 1"	6			Lbyy						Lateral
15	I15	SR 1"	6			Lbyy						Lateral
16	I16	SR 1"	6			Lbyy						Lateral
17	HH1	SR 3/4"	78	16	16	Lbyy						Lateral
18	II3	SR 3/4"	13			Lbyy						Lateral
19	II4	SR 3/4"	13			Lbyy						Lateral
20	II2	SR 3/4"	13			Lbyy						Lateral
21	II1	SR 3/4"	13			Lbyy						Lateral
22	H1	SR 3/4"	52			Lbyy						Lateral
23	I111	SR 1"	6			Lbyy						Lateral
24	I110	SR 1"	6			Lbyy						Lateral
25	I19	SR 1"	6			Lbyy						Lateral
26	I18	SR 1"	6			Lbyy						Lateral
27	I17	SR 1"	6			Lbyy						Lateral
28	I212	SR 3/4"	6			Lbyy						Lateral
29	I21	SR 3/4"	6			Lbyy						Lateral
30	I22	SR 1"	6			Lbyy						Lateral
31	I23	SR 1"	6			Lbyy						Lateral
32	I24	SR 1"	6			Lbyy						Lateral
33	I25	SR 1"	6			Lbyy						Lateral
34	I26	SR 1"	6			Lbyy						Lateral
35	HH2	SR 3/4"	78	16	16	Lbyy						Lateral
36	II7	SR 3/4"	13			Lbyy						Lateral
37	II8	SR 3/4"	13			Lbyy						Lateral
38	II6	SR 3/4"	13			Lbyy						Lateral
39	II5	SR 3/4"	13			Lbyy						Lateral
40	H2	SR 3/4"	52			Lbyy						Lateral
41	I211	SR 1"	6			Lbyy						Lateral
42	I210	SR 1"	6			Lbyy						Lateral
43	I29	SR 1"	6			Lbyy						Lateral
44	I28	SR 1"	6			Lbyy						Lateral
45	I27	SR 1"	6			Lbyy						Lateral
46	I312	SR 3/4"	6			Lbyy						Lateral
47	I31	SR 3/4"	6			Lbyy						Lateral
48	I32	SR 1"	6			Lbyy						Lateral
49	I33	SR 1"	6			Lbyy						Lateral
50	I34	SR 1"	6			Lbyy						Lateral
51	I35	SR 1"	6			Lbyy						Lateral
52	I36	SR 1"	6			Lbyy						Lateral
53	HH3	SR 3/4"	78	16	16	Lbyy						Lateral
54	II11	SR 3/4"	13			Lbyy						Lateral
55	II12	SR 3/4"	13			Lbyy						Lateral
56	II10	SR 3/4"	13			Lbyy						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
57	II9	SR 3/4"	13			Lbyy						Lateral
58	H3	SR 3/4"	52			Lbyy						Lateral
59	I311	SR 1"	6			Lbyy						Lateral
60	I310	SR 1"	6			Lbyy						Lateral
61	I39	SR 1"	6			Lbyy						Lateral
62	I38	SR 1"	6			Lbyy						Lateral
63	I37	SR 1"	6			Lbyy						Lateral
64	ASD	PIPE_2.0	60			Lbyy						Lateral
65	M140A	SR 3/4"	78	16	16	Lbyy						Lateral
66	M141A	SR 3/4"	78	16	16	Lbyy						Lateral
67	M142	SR 3/4"	78	16	16	Lbyy						Lateral
68	M69	SR 3/4	15									Lateral
69	M70	SR 3/4	12									Lateral
70	M71	SR 3/4	15									Lateral
71	M72	SR 3/4	12									Lateral
72	M73	SR 3/4	15									Lateral
73	M74	SR 3/4	12									Lateral
74	M75	SR 3/4	15									Lateral
75	M76	SR 3/4	12									Lateral
76	M77	SR 3/4	15									Lateral
77	M78	SR 3/4	12									Lateral
78	M79	SR 3/4	15									Lateral
79	M80	SR 3/4	12									Lateral
80	WER	PIPE_2.0	60			Lbyy						Lateral
81	M82	PIPE_2.0	60									Lateral
82	M83	PIPE_2.0	60									Lateral
83	M89	PIPE_2.0	18									Lateral
84	M90	PIPE_2.0	52.233									Lateral
85	M92	PIPE_2.0	60			Lbyy						Lateral
86	SDF	PIPE_2.0	60			Lbyy						Lateral
87	M94	PIPE_2.0	60									Lateral
88	M95	PIPE_2.0	60									Lateral
89	M101	PIPE_2.0	18									Lateral
90	M102	PIPE_2.0	52.233									Lateral
91	C1	PIPE_2.0	96									Lateral
92	A1	PIPE_2.0	96									Lateral
93	FDS	PIPE_2.0	60									Lateral
94	M110	PIPE_2.0	18									Lateral
95	M114	PIPE_2.0	60									Lateral
96	C4	PIPE_2.0	96									Lateral
97	M116	PIPE_2.0	60									Lateral
98	M121	SR 3/4	6									Lateral
99	M122	SR 3/4	6									Lateral
100	M123	PIPE_2.0	60									Lateral
101	M128	SR 3/4	6									Lateral
102	M129	SR 3/4	6									Lateral
103	B4	PIPE_2.0	96									Lateral
104	M133	PIPE_2.0	18									Lateral
105	M143	SR 3/4	6									Lateral
106	M144	SR 3/4	6									Lateral
107	M145	SR 3/4	6									Lateral
108	M146	SR 3/4	6									Lateral
109	A4	PIPE_2.0	60			Lbyy						Lateral
110	M156	SR 3/4	6									Lateral
111	M157	SR 3/4	6									Lateral
112	M158	SR 3/4	6									Lateral
113	M159	SR 3/4	6									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
114	B1	PIPE_2.0	60			Lbyy						Lateral
115	M160	PIPE_2.0	200									Lateral
116	M164A	PIPE_2.0	200									Lateral
117	M165	PIPE_2.0	200									Lateral
118	M171	PIPE_2.0	72									Lateral
119	M174	PIPE_2.0	72									Lateral
120	M176	L2.5x2.5x4	20									Lateral
121	M177	L2.5x2.5x4	20									Lateral
122	M178	L2.5x2.5x4	20									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			30		6	
2	Live	None								
3	Wind 0	None					60	244		
4	Wind 30	None					60	244		
5	Wind 60	None					60	244		
6	Wind 90	None					60	244		
7	Wind 120	None					60	244		
8	Wind 150	None					60	244		
9	Ice Load	None					30	122	6	
10	Ice 0	None					60	244		
11	Ice 30	None					60	244		
12	Ice 60	None					60	244		
13	Ice 90	None					60	244		
14	Ice 120	None					60	244		
15	Ice 150	None					60	244		
16	Lm	None				1				
17	Lv	None				1				
18	BLC 1 Transient Area...	None						183		
19	BLC 9 Transient Area...	None						183		

Load Combinations

	Description	S...	PDelta	S...	B...	Fa...	B...	Factor	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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 @ ...	Yes	Y		1	1.2	7	1																
8	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	8	1																
9	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	3	-1																
10	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	4	-1																
11	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	5	-1																
12	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	6	-1																
13	1.2 D + 1.0 Wo @ ...	Yes	Y		1	1.2	7	-1																
14	1.2 D + 1.0 Wo @ ...	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	S...	PDelta	S...	B...	Fa...	B...	Factor	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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...	Yes	Y		1	1.2	3	.053	16	1.5														
28	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	4	.053	16	1.5														
29	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	5	.053	16	1.5														
30	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	6	.053	16	1.5														
31	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	7	.053	16	1.5														
32	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	8	.053	16	1.5														
33	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	3	-.053	16	1.5														
34	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	4	-.053	16	1.5														
35	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	5	-.053	16	1.5														
36	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	6	-.053	16	1.5														
37	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	7	-.053	16	1.5														
38	1.2 D + 1.5 Lm + 1...	Yes	Y		1	1.2	8	-.053	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 [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	1102.746	12	3361.806	24	2813.047	14	.447	4	8.053	14	-1.422	6
2		min	-1160.901	6	852.276	6	-2814.452	8	-1.823	34	-8.072	8	-12.878	24
3	N10	max	2594.06	12	3403.278	20	1422.98	3	-1.587	14	6.926	12	6.466	19
4		min	-2564.406	6	918.261	14	-1367.115	9	-12.284	20	-6.957	6	.519	13
5	N12	max	2163.908	12	3226.788	16	1589.377	3	11.318	16	5.155	6	6.884	17
6		min	-2135.338	6	814.818	10	-1646.655	9	.967	10	-5.116	12	.889	11
7	Totals:	max	5860.714	12	9752.705	24	5498.943	3						
8		min	-5860.646	6	3457.405	6	-5498.855	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	M171	PIPE_2.0	.993	24	22	.142	66		20	20866....	32130	1.872	1.872	2...	H1-1b
2	C1	PIPE_2.0	.970	36	16	.156	36		11	14916....	32130	1.872	1.872	2...	H1-1b
3	M92	PIPE_2.0	.869	25	26	.267	25		14	23808....	32130	1.872	1.872	1...	H1-1b
4	M174	PIPE_2.0	.816	24	26	.127	66		16	20866....	32130	1.872	1.872	2...	H1-1b
5	B4	PIPE_2.0	.790	36	7	.135	36		13	14916....	32130	1.872	1.872	1...	H1-1b
6	ASD	PIPE_2.0	.749	25	22	.220	25		10	23808....	32130	1.872	1.872	1...	H1-1b
7	FDS	PIPE_2.0	.739	12.5	7	.110	12.5		13	23808....	32130	1.872	1.872	1...	H1-1b
8	D2	PIPE_4.0	.682	100	20	.136	100		13	38344....	93240	10.631	10.631	1...	H1-1b
9	D1	PIPE_4.0	.669	100	24	.135	100		17	38344....	93240	10.631	10.631	1...	H1-1b
10	M116	PIPE_2.0	.642	12.5	10	.084	12.5		12	23808....	32130	1.872	1.872	1...	H1-1b
11	M128	SR 3/4	.641	0	11	.350	0		10	13562....	14313....	.179	.179	2...	H1-1b
12	C4	PIPE_2.0	.635	36	10	.060	78		24	14916....	32130	1.872	1.872	2...	H1-1b
13	M95	PIPE_2.0	.582	6.25	18	.044	53.75		18	23808....	32130	1.872	1.872	1...	H1-1b
14	D3	PIPE_4.0	.571	100	17	.155	47.917		15	38344....	93240	10.631	10.631	1...	H1-1b
15	M94	PIPE_2.0	.571	6.25	24	.046	53.75		24	23808....	32130	1.872	1.872	1...	H1-1b
16	SDF	PIPE_2.0	.560	9.375	18	.199	17.5		6	23808....	32130	1.872	1.872	1...	H1-1b
17	F2	PL 6" x 1/2"	.550	8	13	.233	0	y	13	82685....	97200	1.012	12.15	1...	H1-1b
18	A1	PIPE_2.0	.536	36	9	.109	36		20	14916....	32130	1.872	1.872	2...	H1-1b
19	M129	SR 3/4	.522	0	7	.321	6		10	13562....	14313....	.179	.179	2...	H1-1b
20	M114	PIPE_2.0	.521	12.5	9	.085	12.5		20	23808....	32130	1.872	1.872	1...	H1-1b
21	M83	PIPE_2.0	.496	6.25	18	.039	53.75		18	23808....	32130	1.872	1.872	1...	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
22	C2	HSS5x5x5	.488	50	18	.098	50	y	36	20785...	217764	31.602	31.602	1...	H1-1b
23	M82	PIPE_2.0	.486	6.25	24	.040	53.75		24	23808....	32130	1.872	1.872	1...	H1-1b
24	WER	PIPE_2.0	.478	9.375	18	.149	9.375		4	23808....	32130	1.872	1.872	1...	H1-1b
25	FSD	HSS5x5x5	.457	50	26	.100	50	y	22	20785...	217764	31.602	31.602	1...	H1-1b
26	C3	HSS5x5x5	.456	50	18	.082	50	z	8	20785...	217764	31.602	31.602	1...	H1-1b
27	M146	SR 3/4	.452	0	6	.120	0		6	13562....	14313....	.179	.179	2...	H1-1b
28	M121	SR 3/4	.449	0	5	.173	6		10	13562....	14313....	.179	.179	2...	H1-1b
29	H1	SR 3/4"	.436	26	20	.093	26		19	1297.6...	14313....	.179	.179	1...	H1-1b
30	H2	SR 3/4"	.426	26	25	.087	26		25	1297.6...	14313....	.179	.179	1...	H1-1b
31	H3	SR 3/4"	.403	26	24	.090	26		22	1297.6...	14313....	.179	.179	1...	H1-1b
32	M122	SR 3/4	.391	0	6	.153	0		22	13562....	14313....	.179	.179	2...	H1-1b
33	F1	PL 6" x 1/2"	.382	8	5	.210	0	y	5	82685....	97200	1.012	12.15	1...	H1-1b
34	M159	SR 3/4	.360	0	6	.096	0		6	13562....	14313....	.179	.179	2...	H1-1b
35	M145	SR 3/4	.348	0	18	.103	0		6	13562....	14313....	.179	.179	2...	H1-1b
36	I12	SR 1"	.343	0	8	.046	6		8	24686....	25446....	.424	.424	1...	H1-1b
37	F3	PL 6" x 1/2"	.339	8	3	.216	8	y	3	82685....	97200	1.012	12.15	1...	H1-1b
38	I13	SR 1"	.327	0	8	.042	6		7	24686....	25446....	.424	.424	1...	H1-1b
39	I28	SR 1"	.316	0	13	.048	6		7	24686....	25446....	.424	.424	1...	H1-1b
40	I38	SR 1"	.314	0	9	.048	6		3	24686....	25446....	.424	.424	1...	H1-1b
41	M144	SR 3/4	.308	0	6	.053	6		6	13562....	14313....	.179	.179	2...	H1-1b
42	I11	SR 3/4"	.302	0	8	.037	6		8	13562....	14313....	.179	.179	2...	H1-1b
43	I35	SR 1"	.301	0	11	.050	6		5	24686....	25446....	.424	.424	1...	H1-1b
44	I14	SR 1"	.301	0	7	.041	6		7	24686....	25446....	.424	.424	1...	H1-1b
45	I18	SR 1"	.300	0	5	.042	6		11	24686....	25446....	.424	.424	1...	H1-1b
46	HH1	SR 3/4"	.297	13.813	8	.140	46.313		23	9756.1...	14313....	.179	.179	1	H1-1b
47	I39	SR 1"	.295	0	9	.039	6		9	24686....	25446....	.424	.424	1...	H1-1b
48	I110	SR 1"	.291	0	4	.037	6		10	24686....	25446....	.424	.424	1...	H1-1b
49	I19	SR 1"	.291	0	5	.037	6		5	24686....	25446....	.424	.424	1...	H1-1b
50	M158	SR 3/4	.290	0	18	.082	0		6	13562....	14313....	.179	.179	2...	H1-1b
51	M160	PIPE_2.0	.289	175	17	.064	175		21	3541.1...	32130	1.872	1.872	2...	H1-1b
52	I29	SR 1"	.286	0	13	.039	6		7	24686....	25446....	.424	.424	1...	H1-1b
53	I111	SR 1"	.286	0	10	.039	6		14	24686....	25446....	.424	.424	1...	H1-1b
54	I15	SR 1"	.284	0	7	.042	6		13	24686....	25446....	.424	.424	1...	H1-1b
55	I22	SR 1"	.282	0	4	.036	6		4	24686....	25446....	.424	.424	1...	H1-1b
56	I112	SR 3/4"	.281	0	8	.029	6		8	13562....	14313....	.179	.179	1...	H1-1b
57	I23	SR 1"	.274	0	4	.038	6		9	24686....	25446....	.424	.424	1...	H1-1b
58	I34	SR 1"	.266	0	11	.039	6		5	24686....	25446....	.424	.424	1...	H1-1b
59	I24	SR 1"	.265	0	3	.037	6		9	24686....	25446....	.424	.424	1...	H1-1b
60	I25	SR 1"	.258	0	3	.041	6		9	24686....	25446....	.424	.424	1...	H1-1b
61	I310	SR 1"	.256	0	8	.030	6		14	24686....	25446....	.424	.424	1...	H1-1b
62	M143	SR 3/4	.255	0	6	.049	6		6	13562....	14313....	.179	.179	1...	H1-1b
63	M140A	SR 3/4"	.255	64.188	4	.146	31.688		25	9756.1...	14313....	.179	.179	1	H1-1b
64	M157	SR 3/4	.255	0	6	.048	6		6	13562....	14313....	.179	.179	2...	H1-1b
65	M141A	SR 3/4"	.246	16.25	13	.162	31.687		21	9756.1...	14313....	.179	.179	3...	H1-1b
66	HH2	SR 3/4"	.246	13.813	4	.145	46.313		19	9756.1...	14313....	.179	.179	1	H1-1b
67	I311	SR 1"	.242	0	8	.029	6		8	24686....	25446....	.424	.424	1...	H1-1b
68	I21	SR 3/4"	.241	0	4	.026	6		4	13562....	14313....	.179	.179	2...	H1-1b
69	M142	SR 3/4"	.239	16.25	9	.146	31.688		17	9756.1...	14313....	.179	.179	2...	H1-1b
70	I211	SR 1"	.231	0	6	.030	6		6	24686....	25446....	.424	.424	1...	H1-1b
71	HH3	SR 3/4"	.229	61.75	11	.167	46.312		15	9756.1...	14313....	.179	.179	2...	H1-1b
72	M164A	PIPE_2.0	.228	175	21	.066	175		7	3541.1...	32130	1.872	1.872	2...	H1-1b
73	I210	SR 1"	.227	0	6	.033	6		7	24686....	25446....	.424	.424	1...	H1-1b
74	I27	SR 1"	.218	0	13	.041	6		13	24686....	25446....	.424	.424	1...	H1-1b
75	I37	SR 1"	.214	0	9	.046	0		10	24686....	25446....	.424	.424	1...	H1-1b
76	I212	SR 3/4"	.213	0	6	.022	6		6	13562....	14313....	.179	.179	2...	H1-1b
77	I36	SR 1"	.209	0	11	.036	6		11	24686....	25446....	.424	.424	1...	H1-1b
78	M156	SR 3/4	.208	0	18	.043	6		6	13562....	14313....	.179	.179	1...	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
79	I17	SR 1"	.201	0	5	.041	0		18	24686....	25446....	.424	.424	1...	H1-1b
80	II8	SR 3/4"	.200	0	12	.042	0		25	11113....	14313....	.179	.179	2...	H1-1b
81	I312	SR 3/4"	.198	0	6	.021	6		12	13562....	14313....	.179	.179	1...	H1-1b
82	M165	PIPE_2.0	.197	45.833	16	.047	12.5		5	3541.1...	32130	1.872	1.872	1...	H1-1b
83	II12	SR 3/4"	.194	0	3	.053	0		22	11113....	14313....	.179	.179	2...	H1-1b
84	I33	SR 1"	.190	0	5	.035	6		5	24686....	25446....	.424	.424	1...	H1-1b
85	II9	SR 3/4"	.188	0	12	.043	0		23	11113....	14313....	.179	.179	2...	H1-1b
86	II1	SR 3/4"	.187	0	8	.053	0		19	11113....	14313....	.179	.179	2...	H1-1b
87	II4	SR 3/4"	.187	0	4	.048	0		18	11113....	14313....	.179	.179	2...	H1-1b
88	I32	SR 1"	.186	0	6	.028	6		6	24686....	25446....	.424	.424	1...	H1-1b
89	I16	SR 1"	.180	0	7	.044	0		18	24686....	25446....	.424	.424	1...	H1-1b
90	I31	SR 3/4"	.172	0	6	.020	6		6	13562....	14313....	.179	.179	1...	H1-1b
91	II5	SR 3/4"	.169	0	9	.042	0		26	11113....	14313....	.179	.179	2...	H1-1b
92	I26	SR 1"	.168	0	3	.039	0		26	24686....	25446....	.424	.424	1...	H1-1b
93	II7	SR 3/4"	.140	13	12	.085	0		26	11113....	14313....	.179	.179	2...	H1-1b
94	M101	PIPE_2.0	.137	6	6	.090	6		6	31274....	32130	1.872	1.872	3...	H1-1b
95	M178	L2.5x2.5x4	.133	20	9	.059	20	z	9	35215....	38556	1.114	2.537	1...	H2-1
96	II10	SR 3/4"	.133	13	12	.078	0		23	11113....	14313....	.179	.179	2...	H1-1b
97	II11	SR 3/4"	.131	13	9	.091	0		22	11113....	14313....	.179	.179	2...	H1-1b
98	II3	SR 3/4"	.129	13	4	.088	0		18	11113....	14313....	.179	.179	2...	H1-1b
99	II2	SR 3/4"	.128	13	8	.093	0		18	11113....	14313....	.179	.179	2...	H1-1b
100	M176	L2.5x2.5x4	.128	20	5	.098	20	z	11	35215....	38556	1.114	2.537	1...	H2-1
101	II6	SR 3/4"	.117	13	4	.084	0		26	11113....	14313....	.179	.179	2...	H1-1b
102	M89	PIPE_2.0	.116	6	6	.079	6		6	31274....	32130	1.872	1.872	3...	H1-1b
103	M177	L2.5x2.5x4	.104	0	5	.072	20	y	9	35215....	38556	1.114	2.537	1...	H2-1
104	M70	SR 3/4	.095	6	8	.047	6		23	11537....	14313....	.179	.179	1...	H1-1b
105	M72	SR 3/4	.085	6	8	.034	6		23	11537....	14313....	.179	.179	1...	H1-1b
106	M74	SR 3/4	.080	6	6	.048	6		21	11537....	14313....	.179	.179	1...	H1-1b
107	M76	SR 3/4	.071	6	12	.035	6		21	11537....	14313....	.179	.179	1...	H1-1b
108	M123	PIPE_2.0	.067	9.375	10	.042	9.375		12	23808....	32130	1.872	1.872	1...	H1-1b
109	A4	PIPE_2.0	.059	6.25	18	.054	6.25		6	23808....	32130	1.872	1.872	1...	H1-1b
110	M78	SR 3/4	.059	6	6	.045	6		17	11537....	14313....	.179	.179	1...	H1-1b
111	M80	SR 3/4	.052	6	6	.033	6		17	11537....	14313....	.179	.179	1...	H1-1b
112	B1	PIPE_2.0	.048	6.25	18	.039	6.25		6	23808....	32130	1.872	1.872	1...	H1-1b
113	M75	SR 3/4	.035	0	21	.009	0		36	10219....	14313....	.179	.179	1...	H1-1b
114	M69	SR 3/4	.034	15	23	.009	0		21	10219....	14313....	.179	.179	1...	H1-1b
115	M79	SR 3/4	.033	0	17	.008	15		20	10219....	14313....	.179	.179	1...	H1-1b
116	M73	SR 3/4	.031	15	19	.007	0		36	10219....	14313....	.179	.179	1...	H1-1b
117	M77	SR 3/4	.031	15	15	.005	0		8	10219....	14313....	.179	.179	1...	H1-1b
118	M102	PIPE_2.0	.031	52.233	12	.101	0		14	25600....	32130	1.872	1.872	1...	H1-1b*
119	M90	PIPE_2.0	.028	52.233	12	.074	0		4	25600....	32130	1.872	1.872	1...	H1-1b*
120	M71	SR 3/4	.028	0	25	.007	15		34	10219....	14313....	.179	.179	1...	H1-1b
121	M133	PIPE_2.0	.002	6	9	.001	6		9	31274....	32130	1.872	1.872	1	H1-1b
122	M110	PIPE_2.0	.002	6	11	.001	6		11	31274....	32130	1.872	1.872	2...	H1-1b

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Project # 37519-1564.002.7190
By STP
Date: 05/03/19
v0.1, Effective 07/10/18

MOUNT TO TOWER CONNECTION CHECKS

REACTIONS- LC24

Px=	0.051	Kip
Py=	3.36	Kip
(Axial)Pz=	0.269	Kip
Mx=	154.56	Kip-in
My=	2.172	Kip-in
(Torque)Mz=	11.916	Kip-in

Number of Bolts	=	4	
Plate Size	b=	9	in
	d=	9	in
Edge distance for Bolts	=	1.5	in
Bolt group centroid y-coordinate, Yc		4.5	in
Bolt group centroid x-coordinate, Xc		4.5	in
Load eccentricity in x-direction, ex		0	in
Load eccentricity in y-direction, ey		0	in
Total Moment including load eccentricity ΣMx=		154.56	Kips-in
Total Moment including load eccentricity ΣMy=		2.172	Kips-in
Total Moment including load eccentricity ΣMz=		11.916	Kips-in

WELD CHECKS

Standoff Member Type		Square	
Width	=	5	in
Depth (only for square members)	=	5	in
Assumed Weld Size	=	0.2500	
Total Forces in X direction =		0.184	kips
Total Forces in Y direction =		0.515	kips
Total Forces in Z direction =		4.72	kips
Resultant	=	4.75	kips
Φ*Fw (Kip/in)/16" weld =		1.392	
Capacity used		85.25%	

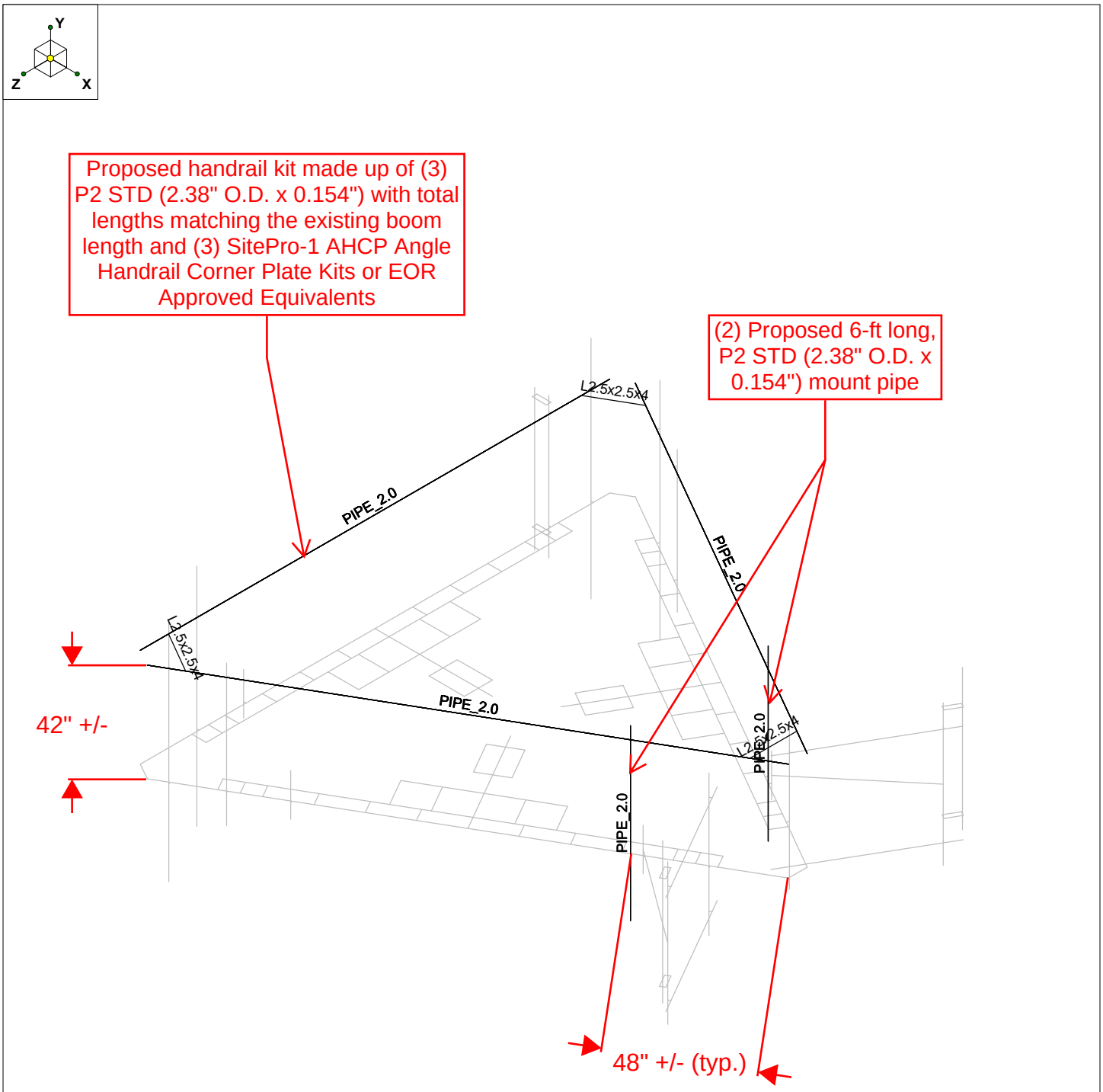
BOLT CHECKS

Tension Reaction	13.13	kip
Shear Reaction	1.43	kip
Bolt Type	A325N	
Bolt Diameter	0.625	in
Tensile Strength	20.7	kips
Shear Strength	12.4	kips
Reduced Tensile Strength	-	kips
Tensile Capacity Used	63.4%	
Shear Capacity Used	11.5%	

Note: Tension reduction not required if tension or shear capacity < 30%

APPENDIX D

SUPPLEMENTAL MODIFICATION INFORMATION



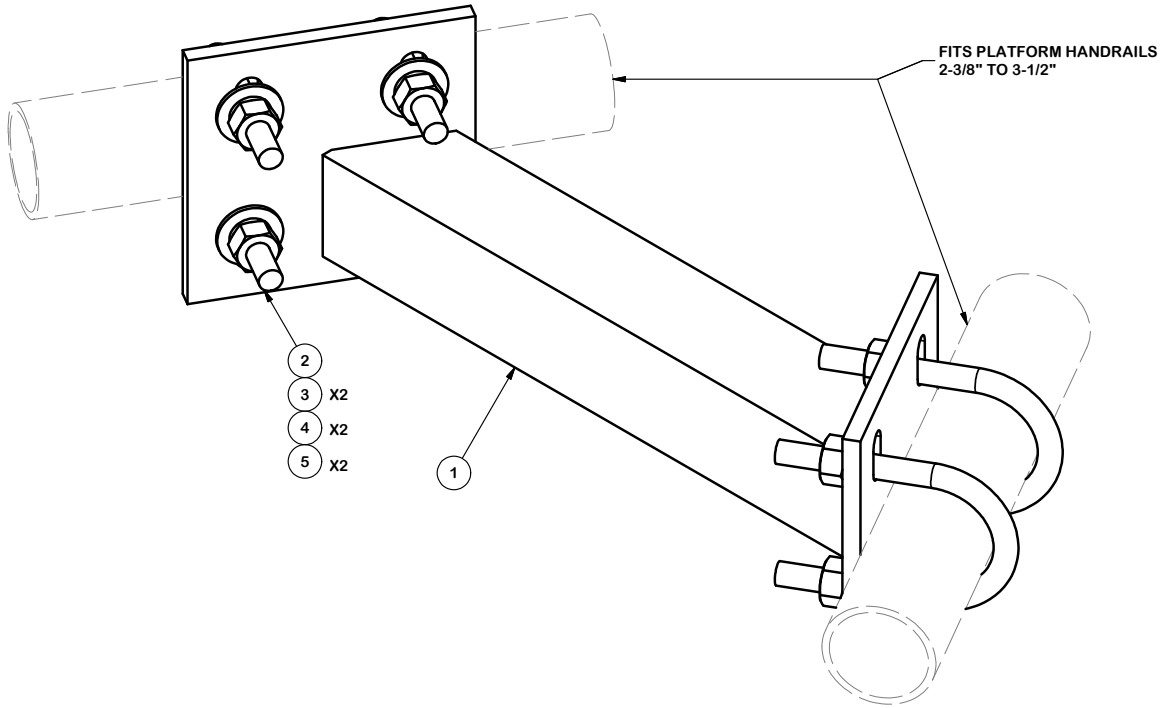
Loads: BLC 1, Dead
Envelope Only Solution

Paul J. Ford and Company	823666 - Deep River Rt9	SK - 8
STP		May 3, 2019 at 12:50 PM
37519-1564.002.7190		37519-1564_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-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	12.92
2	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	2.93
2	4	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	2.93
2	4	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.73	2.93
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57



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: ANGLE HANDRAIL CORNER PLATE 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
	CEK 5/13/2014		AHCP	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	01	CUSTOMER	BMC 5/23/2014	AHCP

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11237C

Deep River/Rt 9
15 Pent Rd
Deep River, CT 06417

May 16, 2019

Transcom Engineering Project Number: 737001-0014

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**5.42 %**

May 16, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CT11237C – Deep River/Rt 9**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **15 Pent Rd, Deep River, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **15 Pent Rd, Deep River, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXVAARR24_43-U-NA20	178
A	2	EMS RR90-17-XXDP (Dormant)	178
B	1	RFS APXVAARR24_43-U-NA20	178
B	2	EMS RR90-17-XXDP (Dormant)	178
C	1	RFS APXVAARR24_43-U-NA20	178
C	2	EMS RR90-17-XXDP (Dormant)	178

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS) and 2100 MHz (AWS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **2.16 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **2100 MHz (AWS)** radio there was **2.23 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **210 feet** of **1-5/8"** coax.

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	9,450.49	1.56
Antenna A2	EMS RR90-17-XXDP	Dormant	NA	0	0	0.00	0.00
						Sector A Composite MPE%	**1.56**
Antenna B1	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	9,450.49	1.56
Antenna B2	EMS RR90-17-XXDP	Dormant	NA	0	0	0.00	0.00
						Sector B Composite MPE%	**1.56**
Antenna C1	RFS APXVAARR24_43-U-NA20	1900 MHz (PCS) / 2100 MHz (AWS) / 600 MHz / 700 MHz	15.65 / 16.35 / 12.95 / 13.35	11	415	9,450.49	1.56
Antenna C2	EMS RR90-17-XXDP	Dormant	NA	0	0	0.00	0.00
						Sector C Composite MPE%	**1.56**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**1.56 %**
AT&T	1.49 %
MetroPCS	0.33 %
Verizon Wireless	2.04 %
Site Total MPE %:	**5.42 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	1.56 %
T-MOBILE Sector B Total:	1.56 %
T-MOBILE Sector C Total:	1.56 %
Site Total:	5.42 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	893.43	178	4.34	1900 MHz (PCS)	1000	0.43%
T-Mobile 1900 MHz (PCS) GSM	1	335.04	178	0.41	1900 MHz (PCS)	1000	0.04%
T-Mobile 2100 MHz (AWS) LTE	2	1,549.36	178	3.77	2100 MHz (AWS)	1000	0.38%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	178	1.92	600 MHz	400	0.48%
T-Mobile 700 MHz LTE	2	432.54	178	1.05	700 MHz	467	0.23%
						Total:	**1.56%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-MOBILE facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	1.56 %
Sector B:	1.56 %
Sector C:	1.56 %
T-MOBILE Maximum Total (per sector):	1.56 %
Site Total:	5.42 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.42 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

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Sterling, MA 01564